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Low Level Internal Dose Screen—Oceanic Tests
Nuclear Test Personnel Review

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13. ABSTRACT *(Maximum 200 words)*

A methodology is developed in DNA-TR-85-317 whereby DoD participants in the CONUS atmospheric nuclear tests are screened to determine whether or not they received a bone dose commitment less than 150 millirem from internally deposited radionuclides. The algorithms that were developed to relate the internal dose commitment to external dose parameters are expanded to cover unique exposure conditions pertinent to oceanic operations such as long-term exposure resulting from fallout on residence islands or ships. Application of the methodology shows that most oceanic test participants received bone dose commitments less than 150 millirem.

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SUMMARY

The results of the internal dose screen of the DoD participants in oceanic nuclear testing are summarized as follows:

- Most participants received a 50-year bone dose commitment less than the screen threshold of 150 millirem.
- The late-time secondary fallout produced by HARDTACK I Fir/Koa on the residence islands and ships resulted in potential for internal dose in excess of the screen threshold for a number of participants.
- The potential for a significant internal dose was minimal for DoD participants at WIGWAM and DOMINIC I, and zero at ARGUS.
- Most scientific project personnel are not addressed in this screen due to complex exposure scenarios and some missing radiochemistry data. Such cases should be handled separately.

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INTRODUCTION

1.1 BACKGROUND.

A primary objective of the Nuclear Test Personnel Review (NTPR) program is to determine the radiation doses, including "internal" doses resulting from inhalation or ingestion of radionuclides, for all DoD nuclear test participants. Since there were few attempts to assess internal doses during the test period, such doses must be calculated using available information regarding the radiological environment and exposure conditions. Detailed calculation of the internal dose for each test participant would be an overwhelming task, therefore, a method is needed to screen groups of participants quickly who were exposed to similar radiological conditions and to identify those who most likely did not receive a significant internal dose.

Reference 1 describes the methodology used to screen participants at continental United States (CONUS) nuclear tests. A committed dose equivalent (50-year) of 150 millirem to the bone was selected as the screen threshold. This dose is 1 percent of the radiation protection guideline (annual limit) for occupational exposure recommended by the National Council on Radiation Protection and Measurements (NCRP) at the time that Reference 1 was developed. The methodology is based on the calculation of limiting radiological parameters (external gamma dose, gamma radiation intensity, etc.) that can be related to a bone dose of 150 millirem for a variety of exposure conditions. By comparing the exposure scenario and radiological parameters applicable to any participant with the calculated data sets, those with bone dose commitments below the selected threshold may be identified.

Combinations of such limiting radiological parameters and exposure conditions corresponding to a bone dose commitment of 150 millirem are codified in Section 3 of Reference 1. The codes are derived from weapon-specific calculations considering all CONUS tests and represent a "worst-case" composite with a few cited exceptions. These codes are used to document the rationale for determining that a particular participant passed the screen, i.e., received an internal bone dose commitment of less than 150 millirem. Test participant groups, by operation and unit or project, who pass the screen are listed in the body of the report.

The choice of bone as a screening organ is not intended to imply that the dose to bone is necessarily greater than that to other organs. Rather, bone is useful because the ratio of other organ dose to bone dose has a relatively predictable maximum for nuclear device debris, whereas

the converse is not true. Certain actinide radionuclides, which have a highly shot-specific abundance relative to fission product radionuclides, increase the dose to bone (including its constituent red marrow and bone surface tissues) in greater proportion than to other organs.

It should be noted that if red bone marrow, the critical organ for leukemia induction, were chosen as the indicator organ for the screen, the results would be essentially the same. Bone doses are calculated using a fallout composite dose conversion factor (rem per curie inhaled) derived from Reference 2. Comparable red marrow doses are determined from a composite dose conversion factor derived from either Reference 2 or Reference 3.

1.2 OCEANIC TEST SCREEN METHODOLOGY.

The same basic methodology used to screen CONUS test participants is applied to the oceanic test participants. For consistency with Reference 1, limiting radiological parameters that can be related to a bone dose commitment of 150 millirem for a variety of exposure conditions are calculated using oceanic shot-specific radiochemistry. The shot-specific radiochemical data were provided by the late Dr. Harry Hicks, formerly of the Lawrence Livermore National Laboratory, the Nuclear Chemistry Section of Los Alamos National Laboratory, and the Air Force Technical Applications Center.

The dose from internal emitters commonly bears a quantitative relationship to external dose. For instance, while resuspended fallout is being inhaled, gamma radiation dose is concurrently accrued from exposure to the same fallout field. Table 1 presents the calculated external dose accrued if sufficient resuspended contamination is inhaled for an internal bone dose commitment of 150 mrem. Because the results are time-dependent, values are given for selected times after the detonation. As in Reference 1, a resuspension factor (K) of 1.0×10^{-5} m^{-1}, a breathing rate of 1.2 m^3/hr, and dose conversion factors (rem/curie inhaled) for aerosols with an Activity Median Aerodynamic Diameter (AMAD) of 1.0 micrometer are used in the calculation. The radionuclides are assumed to be oxides for lung clearance classification purposes.

In general, the oceanic shot-specific results shown in table 1 are similar to those of the CONUS tests; therefore, the codes developed in Reference 1, based on a "worst-case" composite, are applicable to all oceanic tests listed in the table with the exception of REDWING Shots Yuma, Blackfoot, and Kickapoo and HARDTACK I Shots Sequoia and Fig. The codes must be adjusted accordingly for dose assessments involving these shots.

Table 1. External film badge dose (rem) equivalent to internal bone dose commitment of 150 millirem.

OPERATION* - SHOT	1 HOUR	4 HOURS	9 HOURS	1 DAY	2 DAYS	4 DAYS	1 WEEK	2 WEEKS	1 MONTH	2 MONTHS	4 MONTHS	1 YEAR
X - BAKER	2700	500	170	70	36	18	9.9	3.9	1.5	0.56	0.22	0.023
S - X-RAY	3600	750	250	99	52	28	17	7.9	3.3	1.4	0.61	0.067
S - YOKE	3900	880	300	130	68	37	23	12	5.9	2.9	1.6	0.23
S - ZEBRA	3900	870	300	130	67	37	23	12	5.8	2.8	1.6	0.23
G - DOG	3900	860	300	120	65	35	22	11	5.2	2.4	1.2	0.15
G - EASY	3800	830	280	110	60	32	20	10	4.6	2.0	0.99	0.12
G - GEORGE	3900	870	300	130	67	37	23	12	5.7	2.7	1.5	0.22
G - ITEM	3900	880	300	130	67	36	23	12	6.0	2.9	1.7	0.25
I - MIKE	3100	640	250	110	57	28	15	5.7	2.0	0.78	0.33	0.036
I - KING	3900	890	310	130	66	36	23	12	6.1	3.0	1.7	0.27
C - BRAVO	3300	680	250	110	58	30	16	6.6	2.4	0.93	0.40	0.045
C - ROMEO	3100	670	270	120	64	30	16	6.2	2.2	0.84	0.36	0.040
C - KOON	3600	790	280	120	70	39	23	11	4.5	2.0	1.0	0.12
C - UNION	3900	830	300	130	76	42	25	11	4.3	1.7	0.82	0.10
C - YANKEE	3200	670	250	110	59	29	16	6.3	2.2	0.88	0.38	0.042
C - NECTAR	4000	870	310	130	71	40	25	13	5.7	2.6	1.4	0.19
WIGWAM	3600	780	280	120	60	29	17	8.5	3.7	1.6	0.74	0.083
R - LACROSSE	3900	890	310	130	65	35	23	12	6.2	3.1	1.8	0.29
R - CHEROKEE	3900	850	310	130	75	42	25	11	4.6	1.9	0.93	0.12
R - ZUNI	3900	860	300	130	72	41	25	12	5.2	2.2	1.1	0.15
R - YUMA	30	4.2	1.1	0.34	0.15	0.077	0.044	0.020	0.0077	0.0028	0.0011	0.00011
R - ERIE	3400	650	210	74	36	19	11	5.6	2.3	0.92	0.38	0.041
R - SEMINOLE	3200	620	200	73	37	20	11	5.3	2.1	0.84	0.34	0.037
R - FLATHEAD	3900	850	300	130	70	38	24	12	5.1	2.3	1.2	0.15
R - BLACKFOOT	2000	320	95	31	14	7.3	4.3	2.0	0.78	0.29	0.11	0.012
R - KICKAPOO	370	53	14	4.4	2.0	0.99	0.57	0.26	0.10	0.037	0.014	0.0015
R - INCA	2900	500	150	52	25	13	7.7	3.7	1.5	0.57	0.22	0.024
R DAKOTA	4000	880	330	150	80	44	27	13	5.3	2.3	1.1	0.15
R - MOHAWK	4000	860	300	130	69	40	25	12	5.0	2.1	1.0	0.13
R - APACHE	4100	890	320	140	76	43	27	13	5.4	2.3	1.2	0.16
R - NAVAJO	4000	870	310	130	65	35	22	11	5.2	2.4	1.2	0.16
R - TEWA	3800	820	300	130	72	40	23	10	4.0	1.7	0.78	0.095
R - HURON	3800	840	290	120	61	33	21	11	5.0	2.2	1.1	0.15

* See Appendix for abbreviations.

Table 1. External film badge dose (rem) equivalent to internal bone dose commitment of 150 millirem (Continued).

OPERATION* - SHOT	1 HOUR	4 HOURS	9 HOURS	1 DAY	2 DAYS	4 DAYS	1 WEEK	2 WEEKS	1 MONTH	2 MONTHS	4 MONTHS	1 YEAR
H - CACTUS**												
H - FIR	3200	690	290	150	83	33	15	6.9	3.3	1.7	0.95	0.21
H - BUTTERNUT**												
H - KOA	3800	820	290	120	67	37	23	11	4.5	1.9	0.95	0.12
H - WAHOO	3200	660	230	92	46	23	13	6.2	2.5	1.0	0.45	0.048
H - HOLLY	3900	880	300	130	65	35	23	12	5.9	2.9	1.7	0.26
H - NUTMEG	3500	710	230	88	43	23	14	6.9	2.9	1.2	0.53	0.059
H - YELLOWWOOD	3900	880	320	150	80	41	24	13	6.2	3.2	2.0	0.42
H - MAGNOLIA	3400	720	240	90	43	22	14	7.2	3.2	1.3	0.63	0.069
H - TOBACCO**												
H - SYCAMORE**												
H - ROSE**												
H - UMBRELLA	3100	640	220	93	46	22	12	5.6	2.3	0.92	0.39	0.041
H - MAPLE	3900	850	290	110	56	30	19	10	4.8	2.2	1.1	0.15
H - ASPEN	3900	860	300	120	66	37	23	12	5.2	2.3	1.2	0.16
H - WALNUT	4000	880	310	130	70	39	24	12	5.7	2.6	1.4	0.20
H - LINDEN**												
H - REDWOOD	4000	880	310	130	66	37	23	12	5.7	2.7	1.4	0.20
H - ELDER	4000	870	310	130	72	40	25	13	5.5	2.5	1.3	0.18
H - OAK	4100	880	320	140	77	44	27	13	5.2	2.2	1.1	0.14
H - HICKORY	2800	510	150	53	25	13	7.5	3.7	1.5	0.58	0.23	0.024
H - SEQUOIA	1800	310	97	33	15	6.7	3.8	1.8	0.71	0.27	0.10	0.011
H - CEDAR	3400	720	260	120	63	29	15	7.5	3.5	1.7	0.93	0.18
H - DOGWOOD	3400	710	230	87	42	22	14	7.0	3.0	1.3	0.57	0.062
H - POPLAR	3900	870	300	130	66	36	23	12	5.5	2.6	1.4	0.19
H - PISONIA	3900	860	300	120	61	32	21	11	5.4	2.6	1.4	0.20
H - JUNIPER	3400	690	220	82	39	20	12	6.4	2.8	1.2	0.54	0.058
H - OLIVE	3800	830	280	110	55	29	19	9.9	4.6	2.1	1.1	0.13
H - PINE	3400	740	260	110	57	28	16	8.3	3.8	1.8	0.96	0.17
H - QUINCE	Alpha Contamination											
H - FIG	17	2.4	0.64	0.19	0.087	0.043	0.025	0.011	0.0043	0.0016	0.00060	0.000062
D - SWORDFISH	2900	540	180	68	31	14	8.1	3.9	1.6	0.61	0.25	0.026

* See Appendix for abbreviations.
** Incomplete radiochemistry.

Some oceanic tests are missing from table 1. In each case, the specific radiochemical data necessary to perform these calculations have not been made available. Fortunately, due to the nature (location, height of burst, etc.) of these tests, they did not contribute to significant contamination of residence islands or support ships. Therefore, this data gap does not prevent dose assessments for the vast majority of oceanic test participants. The units included in this report were not exposed to fallout from those shots for which radiochemical data are lacking.

Some variations in the application of codes are necessary to accommodate exposure conditions specific to oceanic tests. For example, residence of participants in contaminated areas was unique to oceanic tests; hence, the codes are expanded to consider exposure durations up to 2500 hours (approximately 3.5 months). Whereas the fallout on land areas could remain resuspendable for months, it would not remain so on ships. All naval ships are routinely washed/scrubbed by the crew regardless of the presence of radiological contamination. Consequently, it is likely that any fallout on a ship, if not removed within a few days, would be strongly bound to surface materials. Therefore, for purposes of this screen, resuspension of fallout during routine activity on a ship is considered to be insignificant four days after the contaminating event.

The codes applicable to inhalation of resuspended fallout material consider resuspension factors that were derived primarily from experiments in desert terrain. Shipboard activities, such as wet mopping, hosing a contaminated deck, or simply walking across a deck that has been so decontaminated, do not generate significant concentrations of respirable radioactive dust, therefore, a lower resuspension factor of 1×10^{-6} m^{-1} has been included in the codes to cover such exposure conditions (see Reference 4). The expanded codes used to screen the oceanic nuclear test participants are shown below.

CODE	RATIONALE
Blank	Stated participation does not apply to given shot, or non-participant in (and not impacted by) shot.
IA	Participated in shot activities before, during, or after shot, but not exposed to airborne radioactivity.
IB	Exposed or potentially exposed to airborne activity but provided with absolute (positive pressure) respiratory protection.

II Exposed to resuspended fallout but received an external film badge dose (rem) less than that indicated for the conditions characterized by the matrix below:

	1	2	3	4	5	6	7	8	9
A	4.2	1.3	0.44	0.20	0.10	0.059	0.028	0.011	0.0042
B	42	13	4.4	2.0	1.0	0.59	0.28	0.11	0.042
C	N/A	N/A	44	20	10	5.9	2.8	1.1	0.42
D	N/A	N/A	N/A	N/A	N/A	59	28	11	4.2

Where:

A = Resuspension Factor (K) of $1x10^{-3}m^{-1}$
B = Resuspension Factor (K) of $1x10^{-4}m^{-1}$
C = Resuspension Factor (K) of $1x10^{-5}m^{-1}$
D = Resuspension Factor (K) of $1x10^{-6}m^{-1}$
1 = Up to 4 hours after the detonation
2 = Up to 9 hours after the detonation
3 = Up to 1 day after the detonation
4 = Up to 2 days after the detonation
5 = Up to 4 days after the detonation
6 = Up to 1 week after the detonation
7 = Up to 2 weeks after the detonation
8 = Up to 1 month after the detonation
9 = Up to 2 months after the detonation.

For example, Code IIB2 indicates that the participant was exposed to moderately high levels of resuspended fallout (K = $1x10^{-4}m^{-1}$) no later than 9 hours after the detonation. An external film badge dose of less than 13 rem equates to an internal bone dose commitment of less than 150 mrem. When this code is applied, the actual or reconstructed film badge dose from residual radiation received by the project/unit is entered under "D_{FB}" in the table. In those cases where the actual external dose is unknown but the other parameters are known, the maximum permissible dose limit for the operation is applied. If further research indicates that external doses exceeded the limit, the corresponding bone dose commitment must be reconsidered.

Note: Since maximum permissible doses are used as "upper limits" in some cases and activity-specific film badge doses are used in others, this document should not be used as a source of external dose information.

II Exposed to resuspended fallout in areas where the H+1 hour gamma radiation intensity (R/hr), extrapolated from survey measurements taken approximately 3 feet above the contaminated surface, was less than that indicated for the exposure parameters listed below:

	a	b	c	d	e
A	32	3.2	N/A	N/A	N/A
B	290	29	2.9	N/A	N/A
C	4000	400	40	4	1.6
D	N/A	3700	370	37	15

Where:
- A = Resuspension Factor (K) of $1x10^{-3}m^{-1}$
- B = Resuspension Factor (K) of $1x10^{-4}m^{-1}$
- C = Resuspension Factor (K) of $1x10^{-5}m^{-1}$
- D = Resuspension Factor (K) of $1x10^{-6}m^{-1}$
- a = Exposure duration of up to 1 hour
- b = Exposure duration of up to 10 hours
- c = Exposure duration of up to 100 hours
- d = Exposure duration of up to 1000 hours
- e = Exposure duration of up to 2500 hours.

For example, Code IIAb indicates that the participant operated up to 10 hours in an area where the H+1 hour intensity was less than 3.2 R/hr and the level of resuspended material was extremely high (K = $1x10^{-3}m^{-1}$). Such exposure conditions would result in an internal bone dose commitment of less than 150 mrem. Note that film badge dose information is not required for assignment of these codes; however, use of this code is limited by combinations of duration and intensity that would not lead to exceeding the operational dose limit.

III Exposed to suspended neutron-activated material in the absence of a fallout field. Justification for this code is based on scoping calculations made for the inhalation of

suspended neutron-activated Nevada Test Site (NTS) soil (see Section 2.3 of Reference 1). Similar calculations for Pacific Proving Grounds (PPG) soils or other neutron-activated surfaces have not been made; however, the need for such a code for the oceanic assessments herein did not surface. Code IA is used for activities aboard the neutron-activated target vessels after CROSSROADS Able since the lofting of neutron-activated ship constituents is unlikely.

IV Exposed to nuclear cloud debris while in flight but received an external film badge dose (rem) less than that indicated for the conditions characterized by the matrix below:

1	2	3	4
5.0	2.4	1.1	0.5

Where:
1 = Up to 0.5 hours after the detonation
2 = Up to 1 hour after the detonation
3 = Up to 2 hours after the detonation
4 = Up to 4 hours after the detonation.

Note: Exposures more than 4 hours after the detonation must be evaluated on a case-by-case basis.

For example, Code IV2 indicates that the participant flew through the nuclear cloud or fallout within the first hour after the detonation and received an external film badge dose of 2.4 rem or less for the duration of his immersion in the cloud. His exposure to airborne contaminants may have persisted until he exited the aircraft. No personal protective gear is assumed. Such exposure conditions would result in an internal bone dose commitment of less than 150 mrem.

V Exposed to descending fallout from a nuclear cloud where the H+1 hour radiation intensity (R/hr), extrapolated from survey measurements taken approximately 3 feet above the contaminated surface and corresponding to completed fallout deposition on the surface, was less than that indicated for the conditions listed below:

1	2	3	4	5
30	15	7.5	3	1.5

Where:
1 = Up to 10 hours after the detonation
2 = Up to 20 hours after the detonation
3 = Up to 40 hours after the detonation
4 = Up to 100 hours after the detonation
5 = Up to 200 hours after the detonation.

For example, Code V2 indicates that fallout from the nuclear cloud reached the participant's site and attained a peak radiation intensity within 20 hours after the detonation. Negligible fallout deposition occurred after that time. The peak intensity, adjusted to H+1 hour according to $t^{-1.2}$, was less than 15 R/hr. Under these conditions the participant, even if unprotected, would have received an internal bone dose commitment of less than 150 mrem.

1.3 INGESTION DOSE CONSIDERATIONS.

The codes described in Section 1.2 are applicable only to the inhalation pathway for assessment of internal dose. Possible ingestion dose commitments have been calculated for the servicemen on Rongerik Atoll who were exposed to fallout from CASTLE Bravo (Reference 5). It was determined that the ingestion pathway accounted for the bulk of the body burden evidenced by urinalysis. If the entire calculated intake (about 6 millicuries of fission products) had been ingested, the resulting 50-year dose commitment to the bone would have been 600 mrem, as derived from Reference 6 (fission products rather than actinides were the dominant contributor to bone dose from early Bravo fallout). For application to other possible episodes of ingestion of contaminants, it is useful to note that the ingested amount corresponded roughly to the activity that would have fallen on a plate of food during a meal. This was possible during the deposition of fine fallout particles because of screened buildings that facilitated ventilation--accumulation of fallout was noted indoors at Rongerik.

For other major instances of fallout on ships or residence islands, the duration of the principal deposition was comparable to that at Rongerik and typically would have coincided with one meal. Despite the long residence of personnel at the PPG, meals subsequent to fallout deposition would not have afforded much potential for additional dose commitment. Sealed food stores would have prevented primary contamination of foodstuff, and routine mess hall cleaning

would have precluded repeated exposures at the initial level. Contamination, once on the ground, is ingested only if it enters the food chain. Since routine meals were prepared from imported foodstuff and drinking water--even that from wells on the residence islands was distilled--such contamination is not considered to be a significant source of internal dose. Thus, the level of activity ingested at Rongerik should be indicative of the potential in other residence situations, for corresponding levels of fallout contamination.

Because long-lived emitters are major contributors to the bone dose commitment resulting from ingestion of fallout, other contaminating events, regardless of when exposure began, may be compared to the Rongerik episode by normalizing late-time survey readings to H+1 intensities. The Rongerik extrapolated H+1 hour intensity was 140 R/hr other instances were far less. For the shots contributing most significantly to internal dose that had this potential for an ingestion dose (GREENHOUSE Item, CASTLE Bravo and Romeo, REDWING Tewa, and HARDTACK I Fir/Koa), the H+1 hour intensity did not exceed 3.5 R/hr (except on USS PATAPSCO after CASTLE Bravo). Thus, the associated ingestion dose commitments to bone are less than 600 mrem x 3.5/140 = 15 mrem. At less than 10 percent of the 150 mrem level used in the internal dose screen, ingestion dose does not warrant a case-by-case consideration in determination of each unit's passage or failure of the screen.

SECTION 2

PERSONNEL WITH BONE DOSE COMMITMENT LESS THAN 150 MILLIREM

Application of the methodology discussed in Section 1 results in calculated bone dose commitments (50-year) of less than 150 millirem for personnel assigned to the units included in tables 2 through 38. The assessments cover the exposure periods specified below and are based on unit activity information and radiological data contained in the references listed.

OPERATION	EXPOSURE PERIOD	REFERENCES
CROSSROADS	1 Jul - 31 Aug 1946	4, 7, 8
SANDSTONE	15 Apr - 28 May 1948	9, 10
GREENHOUSE	8 Apr - 20 Jun 1951	11,12
IVY	1 Nov - 31 Dec 1952	13, 14
CASTLE	1 Mar - 31 May 1954	15, 16
WIGWAM	14-15 May 1955	17
REDWING	5 May - 6 Aug 1956	18, 19
HARDTACK I	28 Apr - 31 Oct 1958	20, 21
ARGUS	27 Aug - 10 Sep 1958	22
DOMINIC I	25 Apr - 31 Dec 1962	23

It must be emphasized that the assessments are based on the conditions reflected by the codes and stated activity. For example, the activity stated for the typical crewmember of most participating ships is "Routine crew duties aboard ship." This includes command, navigation, communications, electronics, messing, power plant operation, etc. This does <u>not</u> include activities on contaminated shot islands, small boats, or other vessels; or work on contaminated items (helicopters, watercraft, buoys, etc.) brought on board the vessel under consideration. Such complex exposure scenarios must be considered separately. If additional information surfaces to indicate that the exposure conditions are not fully or accurately portrayed (e.g., if the unit was exposed at a later time than that indicated, such as for post-operational garrison forces), the dose must be re-evaluated.

It should be noted that, in most cases, oceanic test participants were exposed to both descending and resuspended fallout. Both sources are evaluated in each case and the combination is considered in the pass/fail determination. For units that pass the screen, the leading contributor to the dose is indicated by the choice of code (e.g., II vs V) used in the following tables.

It also should be noted that personnel in unlisted units did not necessarily receive a bone dose commitment greater than 150 millirem. In many cases, units are excluded from the list because scenario or exposure conditions have not been adequately identified. This is particularly true for participants in scientific projects; consequently, few scientific project personnel are included in this report. Also, in some cases, the upper-limiting inherent in the application of code definitions may suggest doses greater than 150 millirem, whereas more detailed analysis would qualify them for inclusion in these tables.

Table 2. Operation CROSSROADS, Task Group 1.1 (Technical Group) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
Support Ships				
USS ALBEMARLE	Routine crew duties aboard ship.		IA	IA
USS AVERY ISLAND	Routine crew duties aboard ship.		IA	IA
USS BEGOR	Routine crew duties aboard ship.		IA	IA
USS BURELSON	Routine crew duties aboard ship.		IA	IA
USS CUMBERLAND SOUND	Routine crew duties aboard ship.		IA	IA
USS HAVEN	Routine crew duties aboard ship.		IA	IA
USS KENNETH WHITING	Routine crew duties aboard ship.		IA	IA
USS LCT-1359	Routine crew duties aboard ship.		IA	IA
USS LSM-60	Routine crew duties aboard ship.		IA	IA
USS WHARTON	Routine crew duties aboard ship.		IA	IA

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
TG 1.2 (Flagship)				
USS FALL RIVER	TG command and staff functions or routine crew duties aboard ship.		IA	IA
TU 1.2.1 (Battleships and Cruisers)				
USS ARKANSAS	Evacuated to ROCKBRIDGE* for ABLE. Reboarded ARKANSAS after shot and performed inspection or repair. Lived on ARKANSAS between shots. Evacuated to ROCKBRIDGE* for BAKER. Transferred to other ships* (ARKANSAS sank).		IA	
NAGATO	Evacuated to ROCKINGHAM* for ABLE. Reboarded NAGATO after shot and performed inspection or repair. Lived on ROCK-BRIDGE* between shots. Evacuated to ROCKINGHAM* for BAKER. Transferred to FALL RIVER*, APPLING*, SALT LAKE CITY* or other ships* (NAGATO sank).		IA	
USS NEVADA	Evacuated to GEORGE CLYMER* for ABLE. Reboarded NEVADA after shot and performed inspection or repair. Lived on NEVADA between shots. Evacuated to GEORGE CLYMER* for BAKER. Reboarded NEVADA after shot and performed inspection, repair, or wet decon. Transferred to GENEVA*, CORTLAND*, CLYMER*, DIXIE* or other ships*.	0.76	IA	IID8**

* See assessment of ship for appropriate codes regarding shipboard activity.

** Based on maximum topside reboarding external dose. Assumes topside was washed down prior to activity. Higher resuspension below decks (prior to decon) is offset by correspondingly lower external dose (Reference 4).

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS NEW YORK	Evacuated to ROCKBRIDGE* for ABLE. Reboarded NEW YORK after shot and performed inspection or repair. Lived on NEW YORK between shots. Evacuated to ROCKBRIDGE* for BAKER. Reboarded NEW YORK after shot and performed inspection, repair, or wet decon. Transferred to ROCKWALL*, GENEVA*, DIXIE*, or other ships*.	0.93	IA	IID8**
USS PENNSYLVANIA	Evacuated to GEORGE CLYMER* or ROCKBRIDGE* for ABLE. Reboarded PENNSYLVANIA after shot and performed inspection or repair. Lived aboard PENNSYLVANIA between shots. Evacuated to GEORGE CLYMER* or ROCKBRIDGE* for BAKER. Reboarded PENNSYLVANIA after shot and performed inspection, repair, or wet decon. Departed Bikini aboard NIAGARA*.	0.75	IA	IID8**
USS PENSACOLA	Evacuated to ROCKINGHAM* for ABLE. Reboarded PENSACOLA after shot and performed inspection or repair. Lived on PENSACOLA between shots. Evacuated to ROCKINGHAM* for BAKER. Reboarded PENSACOLA after shot and performed inspection, repair, or wet decon. Transferred to GEORGE CLYMER*, ROCKWALL*, ROCKINGHAM* or other ships*.	1.09	IA	IID8**
PRINZ EUGEN	Evacuated to ROCKINGHAM* for ABLE. Reboarded PRINZ EUGEN after shot and performed inspection or repair. Lived on PRINZ EUGEN between shots. Evacuated to ROCKINGHAM* for BAKER. Reboarded PRINZ EUGEN after shot and performed inspection, repair, or wet decon. Lived on BLADEN*. Transferred to GENEVA* or other ships*.	1.21	IA	IID8**

* See assessment of ship for appropriate codes regarding shipboard activity.
** Based on maximum topside reboarding external dose. Assumes topside was washed down prior to activity. Higher resuspension below decks (prior to decon) is offset by correspondingly lower external dose (Reference 4).

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
SAKAWA	Evacuated to ROCKINGHAM* for ABLE. Transferred to ROLETTE*, OTTAWA*, PALMYRA*, AJAX*, NIAGARA* or NEW YORK* after shot (SAKAWA sank).			
USS SALT LAKE CITY	Evacuated to ROCKBRIDGE* for ABLE. Reboarded SALT LAKE CITY after shot and performed inspection or repair. Lived on SALT LAKE CITY between shots. Evacuated to ROCKBRIDGE* for BAKER. Reboarded SALT LAKE CITY after shot and performed inspection, repair, or wet decon. Transferred to ROCKWALL*, ROCKBRIDGE*, FILLMORE* or other ships*.	0.96	IA	IID8**
TU 1.2.2 (Aircraft Carrier)				
USS INDEPENDENCE	Evacuated to ROCKWALL* for ABLE. Reboarded INDEPENDENCE and performed inspection or repair. Evacuated to ROCKWALL* for BAKER. Reboarded INDEPENDENCE and performed inspection and repair. Lived aboard AJAX*. Transferred to ARTEMIS*, FILLMORE* or other ships*.	0.30	IA	IIC8
USS SARATOGA	Evacuated to ROCKWALL* for ABLE. Reboarded SARATOGA and performed inspection or repair. Lived on SARATOGA between shots. Evacuated to ROCKWALL* for BAKER. Transferred to FALL RIVER* or other ships* (SARATOGA sank).		IA	

* See assessment of ship for appropriate codes regarding shipboard activity.

** Based on maximum topside reboarding external dose. Assumes topside was washed down prior to activity. Higher resuspension below decks (prior to decon) is offset by correspondingly lower external dose (Reference 4).

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
TU 1.2.3 (Destroyer)				
USS ANDERSON	Evacuated to BAYFIELD* for ABLE and remained onboard (ANDERSON sank). Evacuated to AJAX* for BAKER.			
USS CONYNGHAM	Evacuated to BOTTINEAU* for ABLE. Reboarded CONYNGHAM and performed inspection and repair. Lived on CONYNGHAM between shots. Evacuated to BOTTINEAU* for BAKER. Reboarded CONYNGHAM and performed inspection, repair, or wet decon. Lived on ROCKBRIDGE*.	0.36	IA	IID8**
	Remanned CONYNGHAM.			IIDc
USS FLUSSER	Routine crew duties aboard ship.		IA	IA
USS HUGHES	Evacuated to BAYFIELD* for ABLE. Reboarded HUGHES and performed inspection or repair. Lived on HUGHES between shots. Evacuated to BAYFIELD* for BAKER. Reboarded HUGHES and performed inspection and repair. Lived on ROCKINGHAM*. Transferred to NIAGARA* or other ships*.	0.58	IA	IIC8
USS LAMSON	Evacuated to HENRICO* for ABLE. Transferred to AJAX* after shot (LAMSON sank).			
USS MAYRANT	Evacuated to BOTTINEAU* for ABLE. Reboarded MAYRANT and performed inspection or repair. Lived on MAYRANT between shots. Evacuated to BOTTINEAU* for BAKER. Reboarded MAYRANT and performed inspection, repair, or wet decon. Lived on ROCKBRIDGE* and DIXIE*. Transferred to BLADEN* or other ships*.	0.42	IA	IID8**

* See assessment of ship for appropriate codes regarding shipboard activity.

** Based on maximum topside reboarding external dose. Assumes topside was washed down prior to activity. Higher resuspension below decks (prior to decon) is offset by correspondingly lower external dose (Reference 4).

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS MUGFORD	Evacuated to BOTTINEAU* for ABLE. Reboarded MUGFORD and performed inspection or repair. Lived on MUGFORD between shots. Evacuated to BOTTINEAU* for BAKER. Reboarded MUGFORD and performed inspection, repair, or wet decon. Transferred to ROCKWALL* or BLADEN*.	1.43	IA	IID8**
USS MUSTIN	Evacuated to BOTTINEAU* for ABLE. Reboarded MUSTIN and performed inspection or repair. Lived on MUSTIN between shots. Evacuated to BOTTINEAU* for BAKER. Reboarded MUSTIN and performed inspection, repair, or wet decon. Lived on ROCK-BRIDGE*. Transferred to ROCKWALL* or PALMYRA*.	0.27	IA	IID8**
USS RALPH TALBOT	Evacuated to HENRICO* for ABLE. Reboarded RALPH TALBOT and performed inspection or repair. Lived on RALPH TALBOT between shots. Evacuated to HENRICO* for BAKER. Reboarded RALPH TALBOT and performed inspection, repair, or wet decon. Lived aboard ROCKINGHAM*. Departed Bikini on ROCKWALL*.	0.30	IA	IID8**
USS RHIND	Evacuated to BAYFIELD* for ABLE. Reboarded RHIND and performed inspection or repair. Lived on RHIND between shots. Evacuated to BAYFIELD* for BAKER. Reboarded RHIND and performed inspection, repair or wet decon. Lived on ROCKING-HAM*. Transferred to ROCKWALL*, ROCKINGHAM* or PALMYRA*.	0.07	IA	IID8**
USS STACK	Evacuated to BAYFIELD* for ABLE. Reboarded STACK and performed inspection or repair. Lived on STACK between shots. Evacuated to BAYFIELD* for BAKER. Reboarded STACK and performed inspection, repair, or wet decon. Transferred to ROCKINGHAM* or ROCKWALL*.	1.73	IA	IID8**

* See assessment of ship for appropriate codes regarding shipboard activity.

** Based on maximum topside reboarding external dose. Assumes topside was washed down prior to activity. Higher resuspension below decks (prior to decon) is offset by correspondingly lower external dose (Reference 4).

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS TRIPPE	Routine crew duties during ABLE. Ship was not a target ship and did not receive fallout. Evacuated to BAYFIELD* for BAKER. Reboarded TRIPPE and performed inspection, repair, or wet decon. Lived on BEXAR* and DIXIE*. Transferred to CORTLAND*.	0.12	IA	IID8**
USS WAINWRIGHT	Evacuated to BAYFIELD* for ABLE. Reboarded WAINWRIGHT and performed inspection or repair. Lived on WAINWRIGHT between shots. Evacuated to BAYFIELD* for BAKER. Reboarded WAINWRIGHT and performed inspection, repair, or wet decon. Lived on BEXAR*. Transferred to GEORGE CLYMER*.	0.53	IA	IID8**
USS WILSON	Evacuated to BAYFIELD* for ABLE. Reboarded WILSON and performed inspection or repair. Lived on WILSON between shots. Evacuated to BAYFIELD* for BAKER. Reboarded WILSON and performed inspection, repair, or wet decon. Lived on BEXAR*. Departed Bikini on ROCKWALL*.	0.75	IA	IID8**
TU 1.2.4 (Submarine)				
USS APOGON	Evacuated to BOTTINEAU* for ABLE. Reboarded APOGON for inspection or repair. Lived on APOGON between shots. Evacuated to BOTTINEAU* for BAKER. Lived on FILLMORE* prior to assignment to other units*.		IA	

* See assessment of ship for appropriate codes regarding shipboard activity.

** Based on maximum topside reboarding external dose. Assumes topside was washed down prior to activity. Higher resuspension below decks (prior to decon) is offset by correspondingly lower external dose (Reference 4).

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS DENTUDA	Evacuated to BOTTINEAU* for ABLE. Reboarded DENTUDA for inspection or repair. Lived on DENTUDA between shots. Evacuated to BOTTINEAU* for BAKER. Reboarded DENTUDA for inspection, repair, or wet decon. Lived on FILLMORE* or FULTON*.	0.49	IA	IID8**
USS PARCHE	Evacuated to BOTTINEAU* for ABLE. Reboarded PARCHE for inspection or repair. Lived on PARCHE between shots. Evacuated to BOTTINEAU* for BAKER. Reboarded PARCHE for inspection, repair, or wet decon.	0.91	IA	IID8**
	Remanned PARCHE.			IIDc
USS PILOTFISH	Evacuated to BOTTINEAU* for ABLE. Reboarded PILOTFISH for inspection or repair. Lived on PILOTFISH between shots. Evacuated to BOTTINEAU* for BAKER. Transferred to ROCK-WALL*, SYLVANIA*, DENTUDA*, PARCHE*, SEARAVEN*, TUNA*, COUCAL* or ST. CROIX*.		IA	
USS SEARAVEN	Evacuated to BOTTINEAU* for ABLE. Reboarded SEARAVEN for inspection or repair. Lived on SEARAVEN between shots. Evacuated to BOTTINEAU* for BAKER. Reboarded SEARAVEN for inspection, repair, or wet decon. Lived on FILLMORE*.	0.69	IA	IID8**
	Remanned SEARAVEN.			IIDc
USS SKATE	Evacuated to BOTTINEAU* for ABLE. Reboarded SKATE and performed inspection or repair. Lived on SKATE between shots. Evacuated to BOTTINEAU* for BAKER. Reboarded SKATE and performed inspection, repair, or wet decon. Departed Bikini on FILLMORE*.	1.40	IA	IID8**

* See assessment of ship for appropriate codes regarding shipboard activity.

** Based on maximum topside reboarding external dose. Assumes topside was washed down prior to activity. Higher resuspension below decks (prior to decon) is offset by correspondingly lower external dose (Reference 4).

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS SKIPJACK	Evacuated to BOTTINEAU* for ABLE. Reboarded SKIPJACK and performed inspection or repair. Lived on SKIPJACK between shots. Evacuated to BOTTINEAU* for BAKER. Reboarded SKIPJACK for inspection, repair, or wet decon. Lived on FILLMORE*. Transferred to ROCKWALL*, PARCHE*, TUNA*, SEARAVEN*, SKATE* or CHIKASKIA*.	0.65	IA	IID8**
USS TUNA	Evacuated to BOTTINEAU* for ABLE. Reboarded TUNA for inspection or repair. Lived on TUNA between shots. Evacuated to BOTTINEAU* for BAKER. Reboarded TUNA for inspection, repair, or wet decon. Lived on FILLMORE*.	1.31	IA	IID8**
	Remanned TUNA.			IIDc
TU 1.2.5 (Landing Craft)				
USS LST-52	Evacuated to ROCKWALL* for ABLE. Reboarded LST-52 and performed inspection or repair. Lived on LST-52 between shots. Evacuated to ROCKWALL* for BAKER. Transferred to numerous other ships*. No post-BAKER reboarding by crew.		IA	
USS LST-125	Ship not present for ABLE. Only 2 crewmembers remained at PPG after 13 July. They evacuated to ROCKWALL* for BAKER. Further activity unknown.			

* See assessment of ship for appropriate codes regarding shipboard activity.

** Based on maximum topside reboarding external dose. Assumes topside was washed down prior to activity. Higher resuspension below decks (prior to decon) is offset by correspondingly lower external dose (Reference 4).

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS LST-133	Evacuated to ROCKWALL* for ABLE. Reboarded LST-133 and performed inspection or repair. Lived on LST-133 between shots. Evacuated to ROCKWALL* for BAKER. Transferred to AJAX*, DIXIE* or GENEVA*. Crew did not reboard LST-133 post-BAKER.		IA	
USS LST-220	Evacuated to ROCKWALL* for ABLE. Reboarded LST-220 for inspection or repair. Lived on LST-220 between shots. Evacuated to ROCKWALL* for BAKER. Reboarded LST-220 for inspection. Transferred to AJAX*.		IA	IICb
USS LST-545	Evacuated to ROCKWALL* for ABLE. Reboarded LST-545 and performed inspection or repair. Lived on LST-545 between shots. Evacuated to ROCKWALL* for BAKER. Transferred to AJAX*. Crew did not reboard LST-545 post-BAKER.		IA	
USS LST-661	Evacuated to ROCKWALL* for ABLE. Reboarded LST-661 and performed inspection or repair. Lived on LST-661 between shots. Evacuated to ROCKWALL* for BAKER. Reboarded LST-661 for inspection. Departed Bikini on AJAX*. Transferred to GENEVA*.		IA	IICb
USS LCI-327	Evacuated to BAYFIELD* for ABLE. Reboarded LCI-327 and performed inspection or repair. Lived on LCI-327 between shots. Evacuated to BAYFIELD* for BAKER. Departed Bikini on ROCKBRIDGE*. Transferred to AJAX* or GENEVA*. Crew did not reboard LCI-327 post-BAKER; attempts were made by an unidentified boarding party but radiation intensity was too high.		IA	

* See assessment of ship for appropriate codes regarding shipboard activity.

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS LCI-329	Evacuated to BAYFIELD* for ABLE. Reboarded LCI-329 and performed inspection or repair. Lived on LCI-329 between shots. Evacuated to BAYFIELD* for BAKER. Lived on ROCKBRIDGE*. Remanned LCI-329.		IA	IICc
USS LCI-332	Evacuated to BAYFIELD* for ABLE. Reboarded LCI-332 and performed inspection or repair. Lived on LCI-332 between shots. Evacuated to BAYFIELD* for BAKER. Reboarded LCI-322 and performed inspection or repair. Departed Bikini on ROCKBRIDGE*. Transferred to AJAX* or GENEVA*.		IA	IICb
USS LCI-620	Evacuated to BAYFIELD* for ABLE and BAKER. Lived on ROCKBRIDGE*. Departed Bikini on FILLMORE* or ROCK-BRIDGE*.			
USS LCI (L)-549	Evacuated to BAYFIELD* for ABLE. Reboarded LCI (L)-549 and performed inspection or repair. Lived on LCI (L)-549 between shots. Evacuated to BAYFIELD* for BAKER. Lived on ROCKBRIDGE*. Remanned LCI (L)-549.		IA	IICc
USS LCI (L)-615	Evacuated to BAYFIELD* for ABLE. Reboarded LCI (L)-615 and performed inspection or repair. Lived on LCI (L)-615 between shots. Evacuated to BAYFIELD* for BAKER. Remanned LCI (L)-615.		IA	IA
LCT Gp 15 & 21	Routine duties aboard the ship.		Reconstructed bone dose commitment less than 150 mrem. (Reference 24)	

* See assessment of ship for appropriate codes regarding shipboard activity.

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
TU 1.2.6 (Merchant)				
USS APPLING	Routine crew duties aboard ship.		IA	IA
USS ARTEMIS	Routine crew duties aboard ship.		IA	IA
USS BANNER	Evacuated to BOTTINEAU* for ABLE. Reboarded BANNER and performed inspection or repair. Lived on BANNER between shots. Evacuated to BOTTINEAU* for BAKER. Reboarded BANNER and performed inspection and repair. Lived on BEXAR*. Transferred to BEXAR*, GEORGE CLYMER* or PALMYRA*.	0.30	IA	IIC8
USS BARROW	Evacuated to BEXAR* for ABLE. Reboarded BARROW for inspection or repair. Lived on BARROW between shots. Evacuated to BEXAR* for BAKER. Reboarded BARROW and performed inspection and repair. Transferred to GEORGE CLYMER*, BEXAR* or GENEVA*.	0.19	IA	IIC8
USS BLADEN	Evacuated to HENRICO* for ABLE. Reboarded BLADEN for inspection or repair. Lived on BLADEN between shots. Evacuated to HENRICO* for BAKER. Remanned BLADEN.		IA	IA
USS BRACKEN	Evacuated to HENRICO* for ABLE. Reboarded BRACKEN for inspection or repair. Transferred to ROCKBRIDGE*, HENRICO*, APPLING* and GUNSTON HALL* prior to BAKER. Reboarded BRACKEN and performed inspection, repair, or wet decon.	0.18	IA	IID8**

* See assessment of ship for appropriate codes regarding shipboard activity.

** Based on maximum topside reboarding external dose. Assumes topside was washed down prior to activity. Higher resuspension below decks (prior to decon) is offset by correspondingly lower external dose (Reference 4).

Table 3: Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS BRISCOE	Evacuated to BAYFIELD* for ABLE. Reboarded BRISCOE for inspection or repair. Lived on BRISCOE between shots. Evacuated to BAYFIELD* for BAKER. Reboarded BRISCOE for inspection, repair, or wet decon. Lived on ROCKWALL*. Transferred to ROCKWALL*, CORTLAND* or GENEVA*.	0.30	IA	IID8**
USS BRULE	Evacuated to BEXAR* for ABLE. Reboarded BRULE for inspection or repair. Lived on BRULE between shots. Evacuated to BEXAR* for BAKER. Reboarded BRULE for inspection. Transferred to NIAGARA*, BEXAR* or GENEVA*.	0.64	IA	IIC8
USS BUTTE	Evacuated to BEXAR* or ROCKBRIDGE for ABLE. Reboarded BUTTE for inspection or repair. Lived on BUTTE between shots. Evacuated to BEXAR* or ROCKBRIDGE for BAKER. Reboarded BUTTE for inspection, repair, or wet decon. Transferred to GEORGE CLYMER* or BEXAR*.	0.42	IA	IID8**
USS CARLISLE	Evacuated to BEXAR* for ABLE. Transferred to COUCAL*, ORCA*, and various staff functions. CARLISLE sank after ABLE.			
USS CARTERET	Evacuated to BEXAR* for ABLE. Reboarded CARTERET for inspection or repair. Lived on CARTERET between shots. Evacuated to BEXAR* for BAKER. Reboarded CARTERET for inspection, repair, or wet decon. Departed Bikini on GEORGE CLYMER*.	0.93	IA	IID8**

* See assessment of ship for appropriate codes regarding shipboard activity.

** Based on maximum topside reboarding external dose. Assumes topside was washed down prior to activity. Higher resuspension below decks (prior to decon) is offset by correspondingly lower external dose (Reference 4).

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS CATRON	Evacuated to HENRICO* for ABLE. Reboarded CATRON for inspection or repair. Lived on CATRON between shots. Evacuated to HENRICO* for BAKER. Reboarded CATRON for inspection, repair, or wet decon. Lived on ROCKINGHAM*. Transferred to GEORGE CLYMER* or ROCKINGHAM*.	0.74	IA	IID8**
USS CORTLAND	Evacuated to ARTEMIS* for ABLE. Reboarded CORTLAND for inspection or repair. Lived on CORTLAND between shots. Evacuated to ARTEMIS* for BAKER. Remanned CORTLAND.		IA	IA
USS CRITTENDEN	Evacuated to BEXAR* for ABLE. Reboarded CRITTENDEN for inspection or repair. Lived on CRITTENDEN between shots. Evacuated to BEXAR* for BAKER. Reboarded CRITTENDEN for inspection or repair. Transferred to GENEVA*, GEORGE CLYMER* or FILLMORE*.	0.50	IA	IIC8
USS DAWSON	Evacuated to HENRICO* for ABLE. Reboarded DAWSON for inspection or repair. Lived on DAWSON between shots. Evacuated to HENRICO* for BAKER. Reboarded DAWSON for inspection or repair. Lived on ROCKBRIDGE*. Transferred to BLADEN*, SAN MARCOS* or GENEVA*.	0.25	IA	IIC8
USS FALLON	Evacuated to BEXAR* for ABLE. Reboarded FALLON for inspection or repair. Lived on FALLON between shots. Evacuated to BEXAR* for BAKER. Reboarded FALLON for inspection or repair. Transferred to BEXAR* or FILLMORE*.	0.59	IA	IIC8

* See assessment of ship for appropriate codes regarding shipboard activity.

** Based on maximum topside reboarding external dose. Assumes topside was washed down prior to activity. Higher resuspension below decks (prior to decon) is offset by correspondingly lower external dose (Reference 4).

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS FILLMORE	Evacuated to BAYFIELD* for ABLE. Reboarded FILLMORE for inspection or repair. Lived on FILLMORE between shots. Evacuated to BAYFIELD* for BAKER. Remanned FILLMORE.		IA	IA
USS GASCONADE	Evacuated to BEXAR* for ABLE. Reboarded GASCONADE for inspection or repair. Lived on GASCONADE between shots. Evacuated to BEXAR* for BAKER. Reboarded GASCONADE for inspection, repair, or wet decon. Lived on SYLVANIA*. Transferred to BEXAR*.	0.72	IA	IID8**
USS GENEVA	Evacuated to APPLING* for ABLE. Reboarded GENEVA for inspection or repair. Lived on GENEVA between shots. Evacuated to APPLING* for BAKER. Remanned GENEVA.		IA	IA
USS GILLIAM	Evacuated to BOTTINEAU* for ABLE. Transferred to APPLING* or PALMYRA* after shot (GILLIAM sank).			
USS NIAGARA	Evacuated to BAYFIELD* for ABLE. Reboarded NIAGARA for inspection or repair. Lived on NIAGARA between shots. Evacuated to BAYFIELD* for BAKER. Remanned NIAGARA.		IA	IA
TU 1.2.7 (Salvage)	NOTE: Most salvage vessels washed down or sprayed target ships. Unless stated otherwise, this assessment assumes that such operations were performed from the salvage vessel (upwind) and did not expose the crew to airborne radioactivity.			

* See assessment of ship for appropriate codes regarding shipboard activity.

** Based on maximum topside reboarding external dose. Assumes topside was washed down prior to activity. Higher resuspension below decks (prior to decon) is offset by correspondingly lower external dose (Reference 4).

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS ACHOMAWI	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS ATA-180	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS ATA-185	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS ATA-192	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS ATR-40	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS ATR-87	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS CHICKASAW	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS CLAMP	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA

Table 3. Operation CROSSROADS, Task Group 1.2 (Target Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS CONSERVER	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS COUCAL	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS CURRENT	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS DELIVER	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS ETLAH	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS GYPSY	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS MENDER	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS ONEOTA	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA

Table 3. Operation CROSSROADS, Task Group 1.2 (T· rget Vessel Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS PALMYRA	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS PRESERVER	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS RECLAIMER	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS SHAKAMAXON	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS SUNCOCK	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA
USS WIDGEON	Routine crew duties. Work onboard target ships or work with contaminated material brought aboard salvage vessel not considered.		IA	IA

Table 4. Operation CROSSROADS, Task Group 1.3 (Transport Group) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
TU 1.3.1 (Transport)				
USS BAYFIELD	Routine crew duties aboard ship.		IA	IA
USS BEXAR	Routine crew duties aboard ship.		IA	IA
USS BOTTINEAU	Routine crew duties aboard ship.		IA	IA
USS GEORGE CLYMER	Routine crew duties aboard ship.		IA	IA
USS HENRICO	Routine crew duties aboard ship.		IA	IA
USS LST-817	Routine crew duties aboard ship.		IA	IA
USS LST-881	Routine crew duties aboard ship.		IA	IA
USS OTTAWA	Routine crew duties aboard ship.		IA	IA
USS ROCKBRIDGE	Routine crew duties aboard ship.		IA	IA
USS ROCKINGHAM	Routine crew duties aboard ship.		IA	IA
USS ROCKWALL	Routine crew duties aboard ship.		IA	IA
USS ROLETTE	Routine crew duties aboard ship.		IA	IA
USS SAINT CROIX	Routine crew duties aboard ship.		IA	IA
TU 1.3.2 (Press)				
USS APPALACHIAN	Routine crew duties aboard ship.		IA	IA
TU 1.3.3 (Observers)				
USS BLUE RIDGE	Routine crew duties aboard ship.		IA	IA
USS PANAMINT	Routine crew duties aboard ship.		IA	IA

Table 5. Operation CROSSROADS, Task Group 1.4 (Army Ground Group) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
TG 1.4 Headquarters	Performed command and staff functions aboard the WHARTON.		IA	IA
TU 1.4.1 (Engineer Unit)	Berthed on WHARTON. Inspected damage to engineer equipment aboard target ships (APAs 57, 66 and 79).		IA	
	Inspected damage to engineer equipment aboard LST-545 and other vessels beached on Bikini.			IICc
TU 1.4.2 (Signal Unit)	Berthed on WHARTON. Inspected damage to signal equipment aboard NEVADA, ARKANSAS, INDEPENDENCE, PRINZ EUGEN, SARATOGA, NEW YORK, GASCONADE, and on Bikini.		IA	
	Inspected damage to signal equipment aboard NEVADA and PRINZ EUGEN.	1.97		IID8*
TU 1.4.4 (Chemical Unit)	Berthed on WHARTON. Inspected damage to equipment aboard YOG-83, LCT-818, LST-52, LCT-874, LST-661 and LST-220.		IA	
TU 1.4.5 (QM Unit)	Berthed on WHARTON. Inspected damage to equipment aboard 13 target ships. Most of TU departed after shot ABLE.		IA	
	Inspected damage to equipment aboard LST-545 and on Bikini.			IICc
TU 1.4.6 (Air Unit)	Berthed on WHARTON. Inspected equipment aboard the NEVADA, INDEPENDENCE and NEW YORK.		IA	

* Based on combined (NEVADA plus PRINZ EUGEN) maximum reboarding external doses. Assumes topside was washed down prior to activity.

Table 6. Operation CROSSROADS, Task Group 1.5 (Army Air Group) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
TU 1.5.1 (Tactical Operations)	Operated out of Kwajalein.		IA	IA
	Flew bomb drop (ABLE only), pressure gauge drop, and command and control aircraft (B-29s). Did not penetrate radioactive cloud.		IA	IA
	Flew cloud tracking/radiological reconnaissance missions (B-29s). Crew breathed 100% oxygen when radioactivity was encountered.		IB	IB
TU 1.5.2 (Army Air Photographic Unit)	Operating out of Kwajalein, flew photographic and observer missions in C-54 and F-13 aircraft. Aircraft did not penetrate radioactive cloud.		IA	IA
TU 1.5.3 (Instrumentation and Test Requirements)	Operated base support functions at Enewetak. Operating out of Enewetak, flew B-17 drone control aircraft. Control aircraft did not penetrate radioactive cloud. Sample recovery and decon/maintenance operations not considered.		IA	IA
TU 1.5.4 (Air Transport)	Provided airlift for personnel, supplies, and equipment between US and the PPG. Also provided shuttle service between Bikini, Kwajalein, and Enewetak; based at Kwajalein.		IA	IA

Table 6. Operation CROSSROADS, Task Group 1.5 (Army Air Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
TU 1.5.5 (Air Service)	Serviced and maintained Army aircraft at Kwajalein. Also provided engineers, military policemen, and weather forecasting personnel.		IA	IA
TU 1.5.6 (Army Drone Unit)	Combined with TU 1.5.3. See above.			
TU 1.5.7 (Army Air Weather Reconnaissance)	Flew long-range weather recon missions prior to each test; based on Kwajalein.		IA	IA
TU 1.5.8 (Air Orientation)	Transported visitors, observers, the press, and news broadcasters from Kwajalein to Bikini to witness the detonations; based on Kwajalein.		IA	IA
TU 1.5.9 (Air-Sea Rescue)	Based on Enewetak. Provided capability for air-sea rescue operations between Bikini and Enewetak.		IA	IA
TU 1.5.10 (Headquarters)	Contained the command and staff elements of TG 1.5. Operated the task group headquarters on Kwajalein.		IA	IA

Table 7. Operation CROSSROADS, Task Group 1.6 (Navy Air Group) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
TU 1.6.1 Drone Carrier Unit				
1.6.11 USS SHANGRI-LA	Routine crew duties aboard ship.		IA	IA
1.6.12 USS TURNER	Routine crew duties aboard ship.		IA	IA
1.6.12 USS CHARLES CECIL	Routine crew duties aboard ship.		IA	IA
1.6.13 Field Recovery Unit (NAB Roi)	Operated support base facilities. Sample recovery, decon and maintenance of F6F drones not considered.		IA	IA
1.6.14 Carrier Drone Air Unit (VX-2)	Flew F6F drone control aircraft from SHANGRI-LA. Control aircraft did not penetrate radioactive cloud.		IA	IA
1.6.15 Drone Boat Control Air Unit	Operated from SAIDOR, flew TBM drone boat control aircraft. Aircraft did not penetrate radioactive cloud.		IA	IA
TU 1.6.2 Photo Carrier Unit				
1.6.21 USS SAIDOR	Routine crew duties aboard ship.		IA	IA
1.6.22 USS FURSE	Routine crew duties aboard ship.		IA	IA
1.6.22 USS NEWMAN PERRY	Routine crew duties aboard ship.		IA	IA
1.6.23 & 24 Photo Aircraft	Operated from SAIDOR, flew pre- and post-shot photo missions in F6F-5P and TBM-3P aircraft. Aircraft did not penetrate radioactive cloud.		IA	IA

Table 7. Operation CROSSROADS, Task Group 1.6 (Navy Air Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
1.6.25 Helicopter	Operating from SAIDOR, provided air-sea rescue service.		IA	IA
TU 1.6.3 Seaplane Unit				
1.6.31 NAB Ebeye	Operated support base facilities.		IA	IA
1.6.32 Patrol Squadron 32	Operating from Ebeye, flew radiological reconnaissance, photographic, and other support missions in PBM-5 aircraft. Aircraft did not penetrate radioactive cloud.		IA	IA
1.6.33 Air-Sea Rescue Squadron 4	Provided air-sea rescue functions. No rescues were necessary.		IA	IA
TU 1.6.4 Seaplane Tender, Bikini				
USS ORCA	Routine crew duties aboard ship.		IA	IA

Table 8. Operation CROSSROADS, Task Group 1.7 (Destroyer Surface Patrol Group) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
TU 1.7.1 (Destroyer Sq)				
USS ALLEN M. SUMNER	Routine crew duties aboard ship.		IA	IA
USS BARTON	Routine crew duties aboard ship.		IA	IA
USS INGRAHAM	Routine crew duties aboard ship.		IA	IA
USS LAFFEY	Routine crew duties aboard ship.		IA	IA
USS LOWRY	Routine crew duties aboard ship.		IA	IA
USS MOALE	Routine crew duties aboard ship.		IA	IA
USS O'BRIEN	Routine crew duties aboard ship.		IA	IA
USS ROBERT K. HUNTINGTON	Routine crew duties aboard ship.		IA	IA
USS WALKE	Routine crew duties aboard ship.		IA	IA

Table 9. Operation CROSSROADS, Task Group 1.8 (Service Group) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
TU 1.8.1 (Repair and Service)				
USS AJAX	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS ARD-29	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS ATA-124	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS ATA-187	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS CEBU	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS CHIKASKIA	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS CHOWANOC	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA

Table 9. Operation CROSSROADS, Task Group 1.8 (Service Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS COASTERS HARBOR	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS CREON	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS DIXIE	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS ENCORE	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS FULTON	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS HESPERIA	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS LST-388	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS LST-861	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA

Table 9. Operation CROSSROADS, Task Group 1.8 (Service Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS MUNSEE	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS PHAON	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS POLLUX	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS QUARTZ	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS SEVERN	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS SIOUX	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS SPHINX	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS TELAMON	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA

Table 9. Operation CROSSROADS, Task Group 1.8 (Service Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS TOMBIGBEE	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS WENATCHEE	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS WILDCAT	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
TU 1.8.2	No units assigned.			
TU 1.8.3 (Dispatch Boat and Boat Pool)	Small boat operations not considered.		IA	IA
USS GUNSTON HALL	Routine crew duties aboard ship. Exposures resulting from contaminated material brought onboard are not considered.		IA	IA
USS SAN MARCOS	Routine crew duties aboard ship. Exposures resulting from contaminated material brought onboard are not considered.		IA	IA
USS PRESQUE ISLE	Routine crew duties aboard ship. Exposures resulting from contaminated material brought onboard are not considered.		IA	IA
USS LCI(L)-977	Routine crew duties aboard ship. Exposures resulting from contaminated material brought onboard are not considered.		IA	IA
USS LCI(L)-1062	Routine crew duties aboard ship. Exposures resulting from contaminated material brought onboard are not considered.		IA	IA

Table 9. Operation CROSSROADS, Task Group 1.8 (Service Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS LCI(L)-1067	Routine crew duties aboard ship. Exposures resulting from contaminated material brought onboard are not considered.		IA	IA
USS LCI(L)-1091	Routine crew duties aboard ship. Exposures resulting from contaminated material brought onboard are not considered.		IA	IA
USS LCT-1361	Routine crew duties aboard ship. Exposures resulting from contaminated material brought onboard are not considered.		IA	IA
USS LCT-1461	Routine crew duties aboard ship. Exposures resulting from contaminated material brought onboard are not considered.		IA	IA
USS PGM-23	Routine crew duties aboard ship. Exposures resulting from contaminated material brought onboard are not considered.		IA	IA
USS PGM-24	Routine crew duties aboard ship. Exposures resulting from contaminated material brought onboard are not considered.		IA	IA
USS PGM-25	Routine crew duties aboard ship. Exposures resulting from contaminated material brought onboard are not considered.		IA	IA
USS PGM-29	Routine crew duties aboard ship. Exposures resulting from contaminated material brought onboard are not considered.		IA	IA
USS PGM-31	Routine crew duties aboard ship. Exposures resulting from contaminated material brought onboard are not considered.		IA	IA

Table 9. Operation CROSSROADS, Task Group 1.8 (Service Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
TU 1.8.4 (Medical)				
USS BENEVOLENCE	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS BOUNTIFUL	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
TU 1.8.5 (Survey)				
USS BOWDITCH	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS JAMES M. GILLIS	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS JOHN BLISH	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS YMS-354	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS YMS-358	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA

Table 9. Operation CROSSROADS, Task Group 1.8 (Service Group) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ABLE	BAKER
USS YMS-413	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS YMS-463	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
TU 1.8.7 (Rongerik Evacuation)				
USS LST-871	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA
USS LST-989	Routine crew duties aboard ship. Activities aboard target ships or work on contaminated material brought aboard ship not considered.		IA	IA

Table 10. Operation SANDSTONE, Task Group 7.2 (Army) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) X-RAY	YOKE	ZEBRA
1220th Provisional Engineer Battalion					
Battalion Hq and Medical Detachment	Command and support functions on Enewetak and other residence islands.		IICd	V4	V5
1219th Signal Service Platoon	Support functions on Enewetak and other residence islands.		IICd	V4	V5
1218th Composite Service Platoon	Support functions on Enewetak and other residence islands.		IICd	V4	V5
1217th Composite Service Platoon	Support functions on Enewetak and other residence islands.		IICd	V4	V5
18th Engineer Construction Company	Pre-shot construction on Enjebi. Support functions on Enewetak and other residence islands. Post-shot activity on non-residence islands not considered.		IICd	V4	V5
532nd Engineer Boat and Shore Regiment					
Hq Company	Command and support functions on Enewetak and other residence islands.		IICd	V4	V5
Company D	Performed pre-shot construction on Aomon, Lojwa, and Bijire Islands. Post-shot support on Enewetak and other residence islands. Post-shot activity on other islands not considered.		IICd	V4	V5

Table 10. Operation SANDSTONE, Task Group 7.2 (Army) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) X-RAY	YOKE	ZEBRA
Company E	Performed pre-shot construction on Runit Island. Post-shot support on Enewetak and other residence islands. Post-shot activity on other islands not considered.		IICd	V4	V5
Med Det	Established dispensary on Runit for pre-shot support. Moved to Enewetak for remainder of operation.		IICd	V4	V5
461st Transportation Amphibious Truck Co	Performed pre-shot construction on Aomon, Lojwa, and Bijire Islands. Post-shot support on Enewetak and other residence islands. Post-shot activity on other islands not considered.		IICd	V4	V5
854th Transportation Port Co	Support functions on Enewetak and other residence islands.		IICd	V4	V5

Table 11. Operation SANDSTONE, Task Group 7.3 (predominantly Navy) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) X-RAY	YOKE	ZEBRA
Headquarters Staff	Command and staff functions aboard the MT MCKINLEY.		V3	V4	V5
TU 7.3.1 (Flagship)					
USS MT MCKINLEY	Routine crew duties aboard ship.		V3	V4	V5
TU 7.3.2 (Main Naval Task Unit)					
USS PICKAWAY	Routine crew duties aboard ship.		V3	V4	V5
USS WARRICK	Routine crew duties aboard ship.		V3	V4	V5
USS CURTISS	Routine crew duties aboard ship.		V3	V4	V5
USS YANCY	Routine crew duties aboard ship.				V5
USS ALBEMARLE	Routine crew duties aboard ship.		V3	V4	V5
USS LST-45	Routine crew duties aboard ship.		V3	V4	V5
USS LST-219	Routine crew duties aboard ship.		IA	IA	IA
USS LST-611	Routine crew duties aboard ship.		IA	IA	IA
TU 7.3.3 (Off-Shore Patrol)					
USS GARDINERS BAY	Routine crew duties aboard ship.		V3	V4	V5
FASRON-119	Stationed on GARDINERS BAY; maintained PBM-5 patrol aircraft assigned to VP(MS)-6.		V3	V4	V5

Table 11. Operation SANDSTONE, Task Group 7.3 (predominantly Navy) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) X-RAY	YOKE	ZEBRA
VP(MS)-6	Stationed on GARDINERS BAY; flew daylight patrols over proving grounds in PBM-5 aircraft. Aircraft did not penetrate radioactive cloud.		V3	V4	V5
VX-4	Based on Kwajalein; flew night patrols over proving grounds in PB-1W (B-17G) patrol aircraft. Aircraft did not penetrate radioactive cloud.		V5	IICd	V5
Sonobuoy Monitor Unit	Assigned to GARDINERS BAY but monitored sono-buoys from stations on Parry and Enewetak Islands.		IICd	V4	V5
USS HENRY W. TUCKER	Routine crew duties aboard ship.		V3	V4	V5
USS ROGERS	Routine crew duties aboard ship.		V3	V4	V5
USS PERKINS	Routine crew duties aboard ship.		V3	V4	V5
USS SPANGLER	Routine crew duties aboard ship.		V3	V4	V5
USS GEORGE	Routine crew duties aboard ship.		V3	V4	V5
USS RABY	Routine crew duties aboard ship.		V3	IA	V5
USS MARSH	Routine crew duties aboard ship.		V3	V4	V5
USS CURRIER	Routine crew duties aboard ship.		V3	V4	V5
TU 7.3.4 Helicopter Unit					
USS BAIROKO	Routine crew duties aboard ship. Helicopter Unit operations not considered.		V3	V4	V5

Table 11. Operation SANDSTONE, Task Group 7.3 (predominantly Navy) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) X-RAY	YOKE	ZEBRA
TU 7.3.5 (Service Unit)					
USS AREQUIPA	Routine crew duties aboard ship.		V3		
USS MISPILLION	Routine crew duties aboard ship.		V3	V4	V5
USS PASIG	Routine crew duties aboard ship.		V3	V4	V5
YOG-64	Routine crew duties aboard ship.		V3	V4	V5
YW-94	Routine crew duties aboard ship.		V3	V4	V5
USATS FS-211 (Army)	Routine crew duties aboard ship.			V4	
USATS FS-370 (Army)	Routine crew duties aboard ship.		V3	V4	V5
TU 7.3.6 (Cable Unit)					
LSM-250	Routine crew duties aboard ship.		V3	V4	V5
LSM-378	Routine crew duties aboard ship.		V5	V4	V5
TU 7.3.7 (Boat Pool Unit)					
USS COMSTOCK	Routine crew duties except maintenance on contaminated boat pool boats.		V3	V4	V5
USS ASKARI	Routine crew duties except maintenance on contaminated boat pool boats.		V3	V4	V5
LCI-549	Routine crew duties aboard ship.		V3	V4	V5

Table 11. Operation SANDSTONE, Task Group 7.3 (predominantly Navy) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) X-RAY	YOKE	ZEBRA
LCI-1054	Routine crew duties except maintenance on contaminated boat pool boats.		V3	V4	V5
LCI-1090	Routine crew duties except maintenance on contaminated boat pool boats.		V3	V4	V5
Others					
USS DAVIDSON	Routine crew duties aboard ship.		IA	IA	IA
USS GULL	Routine crew duties aboard ship.		IA	IA	IA
USS PELICAN	Routine crew duties aboard ship.		IA	IA	IA
USS QUICK	Routine crew duties aboard ship.		IA	IA	IA
USS SWALLOW	Routine crew duties aboard ship.		IA	IA	IA

Table 12. Operation SANDSTONE, Task Group 7.4 (Air Force) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) X-RAY	YOKE	ZEBRA
TU 7.4.1 Headquarters and Service Unit	Provided supply and maintenance support at Kwajalein.		V5	IICd	V5
	Provided base housekeeping services and operated the dispensary at Kwajalein.		V5	IICd	V5
TU 7.4.2 Drone Unit	Billeting and ground support activities at Kwajalein. Decon and maintenance of B-17 drones at Enewetak not considered.		V5	IICd	V5
	Flew B-17 drone control aircraft in support of cloud sampling activities. Control aircraft did not penetrate radioactive cloud.		IA	IA	IA
TU 7.4.3 Photography Unit	Billeting and ground support activities at Kwajalein.		V5	IICd	V5
	Flew aerial photography missions in C-54 and F-13 aircraft. Aircraft did not penetrate radioactive cloud.		IA	IA	IA
	Recovered film from camera towers in forward area on shot day.	1.0	IIB2	IA	IIB2
	Operated a film processing and photographic laboratory aboard CURTISS.		V3	V4	V5

Table 12. Operation SANDSTONE, Task Group 7.4 (Air Force) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) X-RAY	YOKE	ZEBRA
TU 7.4.4 Weather Unit (Reporting)	Staffed JTF7 Weather Central aboard MT MCKINLEY.		V3	V4	V5
	Manned weather station on Enewetak.		IICd	V4	V5
	Manned weather station on Kwajalein.		V5	IICd	V5
	Manned weather station on Rongerik, Majuro or Wake Island.		IA	IA	IA
TU 7.4.4 Weather Unit (Recon)	Billeting and ground support activities at Kwajalein.		V5	IICd	V5
	Flew cloud tracking missions in WB-29 aircraft. Crew breathed 100% oxygen when in contact with radioactive cloud.		IB	IB	IB
TU 7.4.5 Air Rescue Unit	Operated rescue aircraft out of Kwajalein. No missions flown in contaminated areas.		V5	IICd	V5
TU 7.4.6 Airways and Air Communications Unit	Operated and maintained communications and navigational aids at Enewetak.		IICd	V4	V5
	Operated and maintained communications and navigational aids at Kwajalein.		V5	IICd	V5
	Operated and maintained communications and navigational aids at Rongerik, Majuro or Wake Island.		IA	IA	IA

Table 12. Operation SANDSTONE, Task Group 7.4 (Air Force) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) X-RAY	YOKE	ZEBRA
TU 7.4.7 Inter-island Transport Unit	Billeting and ground support activities at Kwajalein.		V5	IICd	V5
	Ferried personnel and equipment between Kwajalein and Enewetak in C-54 and C-47 aircraft.		IA	IA	IA
	Flew aerial radiological survey missions over shot areas in C-47 aircraft.		IA	IV3	IA
	Transported exposed film and radioactive samples from PPG to US.		IA	IA	IA
TU 7.4.9 Liaison Unit	Billeting and ground support activities on Kwajalein.		V5	IICd	V5
	Flew inter-island transportation missions. Shot island landings not considered.		IA	IA	IA

Table 13. Operation SANDSTONE, Task Group 7.5 (Joint Security) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) X-RAY	YOKE	ZEBRA
Army Element					
369th CIC Det	Various security duties on the residence islands of Enewetak Atoll. Activities on other islands not considered.		IICd	V4	V5
401st CIC Det	Various security duties on the residence islands of Enewetak Atoll. Activities on other islands not considered.		IICd	V4	V5
8456th MP Co	Various security duties on the residence islands of Enewetak Atoll. Activities on other islands not considered.		IICd	V4	V5
Air Force Element					
700-X CIC Det	Guarded drone aircraft when they landed on Enewetak Island.		IICd	V4	V5
	Escorted classified samples and film to CONUS facilities.		IA	IA	IA
Navy Element	Assigned to TG 7.5 headquarters on Enewetak Island.		IICd	V4	V5
Marine Element					
Ship Detachment	Provided security aboard ALBEMARLE, BAIROKO, CURTISS, MT MCKINLEY and PICKAWAY.		V3	V4	V5
Enewetak Detachment	Assigned various security duties on the residence islands of Enewetak Atoll. Activities on other islands not considered.		IICd	V4	V5

Table 14. Operation SANDSTONE, Task Group 7.6 (Joint Radiological Safety) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) X-RAY	YOKE	ZEBRA
TU 7.6.1 Air Monitor Unit	Billeting and ground support activities at Kwajalein. Decon of B-17 drones at Enewetak not included.		V5	IICd	V5
	Monitored radiation levels in manned TG 7.4 missions. Breathed 100% oxygen when in contact with radioactive cloud.		IB	IB	IB
TU 7.6.2 Staff Unit	Supported the Task Group on BAIROKO or MT MCKINLEY.		V3	V4	V5
TU 7.6.3 Operations Unit	Controlled all radsafe missions and maintained current radiological survey data in Radsafe Center aboard MT MCKINLEY. Activities on other islands not considered.		V3	V4	V5
TU 7.6.5 Radiological Records Unit	Maintained exposure records and prepared reports. Operations on BAIROKO and MT MCKINLEY.		V3	V4	V5
TU 7.6.8 Advisory Unit	Provided technical advice to the Task Force Radsafe Officer. Activities on BAIROKO and MT MCKINLEY.		V3	V4	V5
TU 7.6.9 Rear Echelon Unit	Maintained liaison with supporting activities in CONUS.		IA	IA	IA

Table 15. Operation SANDSTONE, Task Group 7.7 (Kwajalein Island Command) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) X-RAY	YOKE	ZEBRA
Navy Element					
VPAM-2	General support at Kwajalein.		V5	IICd	V5
VPHL-8	General support at Kwajalein.		V5	IICd	V5
VR-8	General support at Kwajalein.		V5	IICd	V5
VRU-3	General support at Kwajalein.		V5	IICd	V5
Civil Admin Unit	General support at Kwajalein.		V5	IICd	V5
1509th Construction Battalion	General support at Kwajalein.		V5	IICd	V5
.NAS, Kwajalein	General support at Kwajalein.		V5	IICd	V5
NS, Kwajalein	General support at Kwajalein.		V5	IICd	V5
In-Service Craft	General support at Kwajalein.		V5	IICd	V5
Marine Barracks, Kwajalein	General support at Kwajalein.		V5	IICd	V5
Air Force Element					
2308th Aviation Eng Co	Performed engineering and construction work on Kwajalein to support TG 7.4.		V5	IICd	V5
1535th AFBU	Supported normal ATC trans-Pacific operations at Kwajalein. Support to SANDSTONE operations not considered.		V5	IICd	V5
31-8 AWS Det	Provided weather data on Kwajalein.		V5	IICd	V5

Table 16. Operation GREENHOUSE, Task Group 3.2 (Army) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) DOG	EASY	GEORGE	ITEM
7th Engineer Brigade and 7126th Army Unit	Command functions for TG 3.2 on Enewetak.		IICe	IICe	IA	IICd*
79th Engineer Const Bn	Performed all construction on Enewetak Island prior to the tests. A maintenance engineering section was organized upon the departure of the 79th and was in charge of repair and maintenance of utilities and facilities on the residence islands.		IICe	IICe	IA	IICd*
Quartermaster Det 7128th A.U.	Operated central mess and laundry facilities on Enewetak Island. Handling/laundry of contaminated clothing not considered.		IICe	IICe	IA	IICd*
70th Auto Maint Ordnance Det	Operated exclusively on Enewetak. Supported the 7th Engineer Brigade with heavy field maintenance on ordnance wheeled vehicles. Performed field maintenance on AF general purpose and technical vehicles.		IICe	IICe	IA	IICd*
7127th Army Unit Comm Det	Operated and maintained telephone system on Enewetak Island and the Signal Center facilities on Enewetak and Parry Islands.		IICe	IICe	IA	IICd*
3rd MASH	Operated the hospital on Enewetak Island.		IICe	IICe	IA	IICd*
Hq 18th Trans Corps Port Co	Operated and administered the headquarters for the port at Enewetak.		IICe	IICe	IA	IICd*

* Elements of code matrix are adjusted to shot-specific values.

Table 16. Operation GREENHOUSE, Task Group 3.2 (Army) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text)			
			DOG	EASY	GEORGE	ITEM
511th Trans Corps Port Co	Loaded and unloaded all cargo at Enewetak except that on H&N boats and barges.		IICe	IICe	IA	IICd*
7129th Army Unit	Provided financial services on Enewetak and was the central disbursing unit for Army, Air Force, and Navy personnel.		IICe	IICe	IA	IICd*
7130th Army Unit Special Serv Det	Provided recreational equipment and facilities on the residence islands.		IICe	IICe	IA	IICd*
506th Counterintelligence Corps Det	Performed counterintelligence activities on the residence islands.		IICe	IICe	IA	IICd*
516th Military Police Serv Co	Provided security on Enewetak, Parry, and Japtan. Shot island activities not included.		IICe	IICe	IA	IICd*
4th Trans Truck Co	Provided emergency ground transportation and was responsible for operating the Enewetak Motor Pool.		IICe	IICe	IA	IICd*

* Elements of code matrix are adjusted to shot-specific values.

Table 17. Operation GREENHOUSE, Task Group 3.3 (Navy) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) DOG	EASY	GEORGE	ITEM
Headquarters and Staff	Command functions for TG 3.3 aboard the CURTISS.		IIDc*	V3	IA	IIDc*
TU 3.3.1 (Flagship)						
USS CURTISS	Routine crew duties except small craft maintenance.		IIDc*	V3	IA	IIDc*
TU 3.3.3 (Air Patrol)						
VP-931	Billeting and ground support (except A/C decon) activities at Kwajalein.		IA	IA	IA	IA
TU 3.3.4 (Surface Patrol)						
USS SPROSTON	Routine crew duties.		V1	IA	IA	V2
USS WALKER	Routine crew duties.		V1	V1	IA	V2
TU 3.3.5 (Mobile Boat Pool)						
USS CABILDO	Routine crew duties. Boat pool activities not included.		IIDc*	V3	IA	IIDc*
TU 3.3.6 (Harbor Control)	Controlled harbor entrances from stations on residence islands.		IICe	IICe	IA	IICd**
TU 3.3.7 (Logistics)						
USS LST-859	Routine crew duties.		V1	V3	IA	IA
USNS SGT C.E. MOWER	Routine crew duties.		V1	V3	IA	V2
USNS LT ROBERT CRAIG	Routine crew duties.		V1			
Air Transport Sq (VR-3)	Transported radioactive samples from Enewetak to the US for analysis.		IA	IA	IA	IA

* Washdown system employed during fallout; crew below deck. Otherwise, code V applies.
** Elements of code matrix are adjusted to shot-specific values.

Table 18. Operation GREENHOUSE, Task Group 3.4 (Air Force) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) DOG	EASY	GEORGE	ITEM
TU 3.4.1 (Hq and Hq Sq)	Billeting operation and maintenance of the airbase at Enewetak. Provided medical support.		IICe	IICe	IA	IICd*
	Flew air defense missions out of Enewetak.		IA	IA	IA	IA
TD 3.4.1.1	Provided maintenance and support to TG 3.4 elements on Kwajalein.		IA	IA	IA	IA
TU 3.4.2 (Experimental Aircraft Unit)	Billeting and general support for drone operations at Enewetak. Work on contaminated drones not considered.		IICe	IICe	IA	IICd*
	Flew drone control B-17 and T-33 aircraft in support of scientific projects. Drone controller did not penetrate cloud.		IA	IA	IA	IA
TD 3.4.2.1	Billeting and ground support activities at Kwajalein. Decon not considered.		IA	IA	IA	IA
	Billeting and ground support activities at Enewetak. Decon not considered.		IICe	IICe	IA	IICd*
	Flew cloud tracking and sampling missions in B-50 aircraft. Crew breathed 100% oxygen when in contact with cloud.		IB	IB	IB	IB

* Elements of code matrix are adjusted to shot-specific values.

Table 18. Operation GREENHOUSE, Task Group 3.4 (Air Force) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) DOG	EASY	GEORGE	ITEM
TU 3.4.3 (Communications)	Operated communications facilities at Kwajalein.		IA	IA	IA	IA
	Operated homing beacons and ground-controlled approach equipment at Enewetak.		IICe	IICe	IA	IICd*
TU 3.4.4 (Weather Recon)	Based at Kwajalein.		IA	IA	IA	IA
	Flew cloud tracking/sampling missions in WB-29s. Crew breathed 100% oxygen when in contact with cloud.		IB	IB	IB	IB
	Manned JTF3 Weather Central at Enewetak.		IICe	IICe	IA	IICd*
TU 3.4.5 (We..	Manned JTF3 Weather Central at Enewetak.		IICe	IICe	IA	IICd*
	Manned remote weather stations at Kusiae, Nauru, Bikati, Majuro and Kwajalein.		IA	IA	IA	IA
TU 3.4.7 (Rescue)	Based at Enewetak.		IICe	IICe	IA	IICd*
	Based at Kwajalein.		IA	IA	IA	IA
	Flew long-range SAR missions in SA-16 or B-17 aircraft. Aircraft did not penetrate cloud.		IA	IA	IA	IA

* Elements of code matrix are adjusted to shot-specific values.

Table 19. Operation IVY, Task Group 132.2 (Army) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) MIKE	KING
7126th Army Unit	Headquarters and support functions for TG 132.2 on Enewetak. Operation of contaminated clothes laundry not included.		IICe	IICd
4th Transportation Truck Co	Provided ground transportation and operated the motor pool on Enewetak.		IICe	IICd
18th MP Criminal Investigation Div	Support functions on Enewetak.		IICe	IICd
125th MP Provost Marshal Det	Support functions on Enewetak.		IICe	IICd
511th Transportation Port Co	Operated and maintained the port at Enewetak Atoll.		IICe	IICd
516th MP Service Co	Security functions on Enewetak and Parry. Post-shot security sweeps on northern islands not included.		IICe	IICd
7131st Army Unit Signal Det	Maintained and operated communication systems on Enewetak and Parry Islands.		IICe	IICd
8607th AAU, Comm Security Det #1	Monitored communications on Enewetak.		IICe	IICd
	Monitored communications aboard USS ESTES.		V4	V3
Sub Det C, Provisional Counterintelligence Corps	Administrative support to TG 132.2 on Enewetak.		IICe	IICd

Table 20. Operation IVY, Task Group 132.3 (Navy) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) MIKE	KING
Headquarters & Staff	Command and staff function aboard RENDOVA.		V4	V3
TE 132.30 (Weapons Element)				
USS CURTISS	Routine crew duties aboad ship.		V4	IA
TE 132.31 (Transport Element)				
USS ESTES	Routine crew duties aboard ship. Helicopter operations not considered.		V4	V3
USNS DAVID C. SHANKS	Routine crew duties aboard ship.		V4	
USNS GENERAL E.T. COLLINS	Routine crew duties aboard ship.		V4	V3
USS LEO	Routine crew duties aboard ship.		V4	IA
USS LST-836	Routine crew duties aboard ship.		V4	IA
TE 132.32 (Service and Harbor Control)				
USS AGAWAM	Routine crew duties aboard ship.		V4	V3
USS ARIKARA	Routine crew duties aboard ship.		V4	
USS ELDER	Routine crew duties aboard ship.		V4	
USS LIPAN	Routine crew duties aboard ship.		V4	V3
USS OAK HILL	Routine crew duties aboard ship. Boat pool activities not considered.		V4	V3

Table 20. Operation IVY, Task Group 132.3 (Navy) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) MIKE	KING
USS YUMA	Routine crew duties aboard ship.		V5	
Underwater Detection Unit	Operated hydrophone system across Enewetak Lagoon entrances.		IICe	IICd
TE 132.33 (Destroyer Element)				
USS CARPENTER	Routine crew duties aboard ship.		V5	V3
USS FLETCHER	Routine crew duties aboard ship.		V5	V3
USS O'BANNON	Routine crew duties aboard ship.		V5	IA
USS RADFORD	Routine crew duties aboard ship.		V4	V3
TU 132.3.0 (Carrier Unit)				
USS RENDOVA	Routine crew duties aboard ship. Helicopter operations not included.		V4	V3
TU 132.3.1 (Patrol Plane Unit)				
FASRON-110	Flew support missions out of Kwajalein.		IICe	IA
VP-2	Flew support missions out of Kwajalein.		IICe	IA

Table 21. Operation IVY, Task Group 132.4 (Air Force) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) MIKE	KING
Headquarters and Staff	Command and staff functions at Kwajalein.		IICe	IA
TU 132.4.1 (Test Support Unit)	Operated the airbase at Enewetak. Interatoll transportation, rad-safe activities and photographic missions not considered.		IICe	IICd
	Operated the airbase at Kwajalein. Interatoll transportation, rad-safe activities and photographic missions not considered.		IICe	IA
TU 132.4.2 (Test Aircraft Unit)				
Headquarters and Staff	Command and staff functions at Kwajalein.		IICe	IA
TAU Sampler Element	Based at Kwajalein.		IICe	IA
	Operated F-84G cloud sampling aircraft in support of Projects 1.1, 1.2, 5.4b and 7.3. Crew breathed 100% oxygen.		IB	IB
TAU Drop Element	Based at Kwajalein.		IICe	IA
	Flew B-36 drop aircraft for Shot KING.			IA
TAU Control and Tanker Element	Based at Kwajalein.		IICe	IA
	Flew air control and refueling missions in support of the cloud sampling aircraft. Aircraft did not penetrate cloud.		IA	IA
TAU Effects Element	Based at Kwajalein.		IICe	IA
	Operated B-29s, a B-36 and a B-47 for Projects 6.10, 6.11 and 8.5. Aircraft did not penetrate cloud or fallout.		IA	IA

Table 21. Operation IVY, Task Group 132.4 (Air Force) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) MIKE	KING
TU 132.4.3 (Test Service Unit)				
Headquarters and Staff	Command and staff functions at Kwajalein.		IICe	IA
TSU Weather Recon Element	Based at Kwajalein.		IICe	IA
	Operated WB-29 aircraft for long-range weather recon missions.		IA	IA
	Flew cloud sampling missions in support of Project 7.3. Sampling crews breathed 100% oxygen.		IB	IB
TSU Weather Reporting Element	Manned weather stations at Kwajalein, Ponape, Kusaie, Majuro, and Bikini.		IICe	IA
	Operated JTF 132 Weather Central on Parry Island. Manned weather station on Enewetak Island.		IICe	IICd
TSU Communications Element	Based at Kwajalein. Operated communications systems and NAVAIDS for TG 132.4 aircraft.		IICe	IA
	Based at Enewetak.		IICe	IICd
	Based at Kwajalein, Ponape, Majuro, Kusaie, or Bikini.		IICe	IA

Table 22. Operation CASTLE, Task Group 7.2 (Army) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for code.) B	R	K	U	Y	N
7126th AU, Enewetak								
Hq and Hq Det	Command and staff functions for TG 7.2 on Enewetak.		IICe	IICe*	IA	IA	IA	IICd
Service Det	Support functions on Enewetak or Parry Island.		IICe	IICe*	IA	IA	IA	IICd
Signal Det	Support functions on Enewetak or Parry Island.		IICe	IICe*	IA	IA	IA	IICd
MP Det	Support functions on Enewetak or Parry Island.		IICe	IICe*	IA	IA	IA	IICd
Port Det	Support functions on Enewetak or Parry Island.		IICe	IICe*	IA	IA	IA	IICd
Truck Det	Support functions on Enewetak or Parry Island.		IICe	IICe*	IA	IA	IA	IICd
8600th AAU, Comm Security Det	Support functions on Enewetak or Parry Island.		IICe	IICe*	IA	IA	IA	IICd
CIC Provisional Det	Support functions on Enewetak or Parry Island.		IICe	IICe*	IA	IA	IA	IICd
18th MP CID	Support functions on Enewetak or Parry Island.		IICe	IICe*	IA	IA	IA	IICd

* Elements of code are adjusted to shot-specific values.

Table 23. Operation CASTLE, Task Group 7.3 (Navy) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for code.) B	R	K	U	Y	N
TG 7.3 Hq and Staff	Command and staff functions aboard BAIROKO until 6 March, when headquarters transferred to CURTISS.		IIDc*	IA	IA	IA	IA	IA
TU 7.3.0 (Special Devices)								
USS CURTISS	TG command and regular crew duties aboard ship.		IIDc*	IA	IA	IA	IA	IA
TU 7.3.1 (Surface Security)								
USS EPPERSON	Routine crew duties aboard ship.		V2	V3	IA	IA	IA	V2
USS NICHOLAS	Routine crew duties aboard ship.		IA	V4	IA	IIDc*	IA	V2
USS PHILIP	Routine crew duties aboard ship.		V2	V4**	IA	IA	IA	IA
USS RENSHAW	Routine crew duties aboard ship.		V2	V3	IA	IA	IA	V2
USS PC-1546	Routine crew duties aboard ship.		V2	V4	IA	IA	IA	
TU 7.3.2 (Carrier)								
USS BAIROKO	Routine crew duties aboard ship. Marine helicopter unit (HMR-362) activities not included.		IIDc*	V3	IA	IA	IA	IA
VC-3	Flew air defense missions out of Enewetak. Did not fly into contaminated areas.		IICe	IICe**	IA	IA	IA	IICd

* Washdown system employed during fallout; crew below deck. Otherwise, code V2 applies.
** Elements of code are adjusted to shot-specific values.

Table 23. Operation CASTLE, Task Group 7.3 (Navy) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for code.) B	R	K	U	Y	N
TU 7.3.3 (Patrol Plane)								
VP-29	Based at Kwajalein.		IICe	IICe	IA	IA	IICd	IA
	Flew security sweeps of the PPG danger areas prior to shots in P2V-6 aircraft. Aircraft did not encounter significant contamination.		IA	IA	IA	IA	IA	IA
VP-29	Based at Enewetak.		IICe	IICe**	IA	IA	IA	IICd
	Flew P2V-5 aircraft in support of Project 6.4. Aircraft did not encounter significant contamination.		IA	IA	IA	IA	IA	IA
	Flew PB4Y-2 aircraft in support of Project 1.4. Aircraft did not encounter significant contamination.		IA	IA	IA	IA	IA	IA
VR-7	Based at Enewetak.		IICe	IICe**	IA	IA	IA	IICd
	Provided inter-atoll air passenger service in specifically configured PBM-5A aircraft. Aircraft did not encounter significant contamination.		IA	IA	IA	IA	IA	IA
NAS-Kwajalein	Support functions at Kwajalein except aircraft decon.		IICe	IICe	IA	IA	IICd	IA
TU 7.3.4 (Flagship)								
USS ESTES	Command functions and routine crew duties aboard ship.		IIDc*	V3	IA	IA	IA	IA

* Washdown system employed during fallout; crew below deck. Otherwise, code V2 applies.
** Elements of code are adjusted to shot-specific values.

Table 23. Operation CASTLE, Task Group 7.3 (Navy) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for code.) B	R	K	U	Y	N
TU 7.3.5 (Utility)								
USS APACHE	Routine crew duties. Recovery of Project 2.5 buoys not considered.		IIDc*	V3	IA	IA	V3	
USS COCOPA	Routine crew duties. Project 1.4 support not considered.		V2	V3	IA	V2	IA	IA
USS GYPSY	Routine crew duties except decon of harbor craft and small boats left in lagoon during shot.		V2	IA	IA			
USS MENDER	Routine crew duties. Project 1.4 support not considered.			V3	IA	V2	IA	
USS MOLALA	Routine crew duties. Project 6.4 and 6.5 support not considered.		IA	V3	IA	IA	IA	V2
USS SIOUX	Routine crew duties. Recovery of Project 2.5 buoys not considered.		V2	V4**	IA	IA	IA	V2
USS TAWAKONI	Routine crew duties.		IA	V4	IA	IA	IA	
TU 7.3.7.1 (Bikini Harbor Element)								
USS BELLE GROVE	Routine crew duties aboard ship. Boat pool activities not considered.		V2	V4**	IA	IA	IA	IA

* Washdown system employed during fallout; crew below deck. Otherwise, code V2 applies.
** Elements of code are adjusted to shot-specific values.

Table 23. Operation CASTLE, Task Group 7.3 (Navy) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for code.) R	R	K	U	Y	N
TU 7.3.7.2 (Mine Project Element)								
USS SHEA	Routine crew duties aboard ship				IA	V2		
USS RECLAIMER	Routine crew duties aboard ship.				IA	V2		
TU 7.3.7.3 (Mine Laying Element)								
USS LST-1157	Routine crew duties aboard ship.				IA	V2	IA	V2
TU 7.3.8 (Enewetak Harbor Unit)	Operated port and refueling facilities (barges) at Enewetak.		IICc	IICc**	IA	IA	IA	IICd
UW Detection Unit	Operated hydrophone arrays across both entrances of lagoon. Stationed on Enewetak.		IICc	IICc**	IA	IA	IA	IICd
TU 7.3.9 (Transport)								
USS AINSWORTH	Routine crew duties aboard ship.		V3	V4	IA	IA	IA	IA
USS LST-551	Routine crew duties aboard ship.		V2	V4	IA	IA	IA	V2
USS LST-762	Routine crew duties aboard ship.		V2	V4	IA	IA	V3	
USS LST-975	Routine crew duties aboard ship.						V3	
USS LST-1146	Routine crew duties aboard ship.			V4				
Other: USS LST 825	Routine crew duties aboard ship.		V2					

* Washdown system employed during fallout; crew below deck. Otherwise, code V2 applies.
** Elements of code are adjusted to shot-specific values.

Table 24. Operation CASTLE, Task Group 7.4 (Air Force) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for code.) B	R	K	U	Y	N
Hq, TG 7.4	Command and staff functions at Enewetak.		IICe	IICe*	IA	IA	IA	IICd
Test Support Unit (TSuU)								
4930th TSu Gp	Command and staff functions at Enewetak.		IICe	IICe*	IA	IA	IA	IICd
4931st TSu Sq	Based at Enewetak.		IICe	IICe*	IA	IA	IA	IICd
	Flew C-54 aircraft in support of Project 9.1 and other documentary photo missions. Aircraft did not penetrate cloud.		IA	IA	IA	IA	IA	IA
	Flew airlift missions between Enewetak and Bikini Atolls in C-47s. Aircraft did not penetrate cloud.		IA	IA	IA	IA	IA	IA
	Flew intra-atoll airlift missions in H-13 helicopters. Shot island visits not considered.		IA	IA	IA	IA	IA	IA
	Flew intra-atoll airlift mission in L-13 aircraft. Shot island visits not considered.		IA	IA	IA	IA	IA	IA
4932nd TSu Sq	Operated and maintained the airfield at Enewetak.		IICe	IICe*	IA	IA	IA	IICd
Test Aircraft Unit (TAU)								
4926th Test Sq	Based on Enewetak.		IICe	IICe*	IA	IA	IA	IICd
	Flew cloud sampling missions in F-84G aircraft. Breathed 100% oxygen when in contact with cloud.		IB	IB	IB	IB	IB	IB

* Elements of code matrix adjusted to shot-specific values.

Table 24. Operation CASTLE, Task Group 7.4 (Air Force) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for code.) B	R	K	U	Y	N
7th, 9th and 36th Bomb Wing	Based at Enewetak.		IICe	IICe*	IA	IA	IA	IICd
	Flew cloud sampling and sampler control missions in B-36 aircraft. Breathed 100% oxygen when in contact with cloud.		IB	IB	IB	IB	IB	IB
77th Strategic Recon Wing	Based at Enewetak.		IICe	IICe*	IA	IA	IA	IICd
	Flew cloud sampler control and documentary photo missions. Breathed 100% oxygen when in contact with cloud.		IB	IB	IB	IB	IB	IB
11th Bomb Wing	Based at Enewetak.		IICe	IICe*	IA	IA	IA	IICd
	Flew B-36 aircraft for Project 6.2a. Aircraft did not penetrate cloud.		IA	IA	IA	IA	IA	IA
WADC	Based at Enewetak.		IICe	IICe*	IA	IA	IA	IICd
	Flew B-47 aircraft for project 6.2a. Aircraft did not penetrate cloud.		IA	IA	IA	IA	IA	IA
97th Bomb Wing	Based at Guam but staged out of Enewetak.		IICe	IICe*	IA	IA	IA	IICd
	Flew B-50 aircraft in support of Project 6.1. Aircraft did not penetrate cloud.		IA	IA	IA	IA	IA	IA
Test Services Unit (TSU)								
77th Strategic Recon Sq	Based at Enewetak.		IICe	IICe*	IA	IA	IA	IICd

* Elements of code matrix adjusted to shot-specific values.

Table 24. Operation CASTLE, Task Group 7.4 (Air Force) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for code.) B	R	K	U	Y	N
77th Strategic Recon Sq (continued)	Flew weather reconnaissance cloud tracking, cloud sampling missions in WB-50 aircraft. Crew breathed 100% oxygen on sampling missions; otherwise cloud penetration was not necessary.		IB	IB	IB	IB	IB	IB
57th Strategic Recon Sq	Based at Enewetak.		IICe	IICe*	IA	IA	IA	IICd
	Flew weather reconnaissance cloud tracking, cloud sampling missions in WB-50 aircraft. Crew breathed 100% oxygen on sampling missions; otherwise cloud penetration was not necessary.		IB	IB	IB	IB	IB	IB
57th Strategic Weather Recon Sq	Based at Enewetak.		IICe	IICe*	IA	IA	IA	IICd
	Flew weather reconnaissance cloud tracking, cloud sampling missions in WB-50 aircraft. Crew breathed 100% oxygen on sampling missions; otherwise cloud penetration was not necessary.		IB	IB	IB	IB	IB	IB
78th Air Rescue Sq	Based at Enewetak.		IICe	IICe*	IA	IA	IA	IICd
	Flew search and rescue missions in SA-16. Evacuation of Rongerik not considered.		IA	IA	IA	IA	IA	IA
Other Units								
47th, 49th, 50th, 51st and 1500th Air Transport Squadrons	Provided air logistical support from CONUS to the PPG.		IA	IA	IA	IA	IA	IA

* Elements of code matrix adjusted to shot-specific values.

Table 25. Operation WIGWAM, Task Group 7.3 (predominantly Navy) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) WIGWAM
CTG 7.3	Command and staff functions aboard MT MCKINLEY or CURTISS.		IA
TU 7.3.0 (Flagship)			
USS MT MCKINLEY	Routine crew duties aboard ship.		IA
USS CURTISS	Routine crew duties aboard ship.		IA
TU 7.3.2 (Carrier Air Support)			
USS WRIGHT	Routine crew duties aboard ship.		IA
HMR-362	Flew helicopters to YAGs; transported samples from YAGs to WRIGHT on shot day to D+4.	0.32	IIB5
VS-21	Flew airborne radiological survey missions in AD-5N aircraft.	0.10	IV4
VC-35	Transported samples from WRIGHT to CONUS in AF-2S aircraft.		IA
TU 7.3.3 (Surface Patrol)			
USS BLUE	Routine crew duties aboard ship.		IA
USS ALFRED A. CUNNINGHAM	Routine crew duties aboard ship.		IA
USS FRANK E. EVANS	Routine crew duties aboard ship.		IA
USS MCKEAN	Routine crew duties aboard ship.		IA

Table 25. Operation WIGWAM, Task Group 7.3 (predominantly Navy) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) WIGWAM
USS WALKE	Routine crew duties aboard ship.		IA
USS O'BRIEN	Routine crew duties aboard ship.		IA
USS HARRY E. HUBBARD	Routine crew duties aboard ship.		IA
USS ERNEST G. SMALL	Routine crew duties aboard ship.		IA
TU 7.3.4 (Surface Support)			
TE 7.3.4.1 (Transport)			
USS COMSTOCK	Routine crew duties aboard ship.		IA
USS FT MARION	Routine crew duties aboard ship.		IA
TE 7.3.4.2 (Wire)			
USS MARION COUNTY	Routine crew duties aboard ship.		IA
USS MORGAN COUNTY	Routine crew duties aboard ship.		IA
TE 7.3.4.3 (Towing and Salvage)			
USS BUTTERNUT	Routine crew duties aboard ship.		IA
USS BOLSTER	Routine crew duties aboard ship.		IA
	Boarded submarine pontoons and prepared them for tow.	0.20	IIC4
USS CHANTICLEER	Routine crew duties aboard ship, including wet decon.	0.20	IID4
USS CREE	Routine crew duties aboard ship.		IA

Table 25. Operation WIGWAM, Task Group 7.3 (predominantly Navy) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) WIGWAM
USS HITCHITI	Routine crew duties aboard ship.		IA
USS MOCTOBI	Routine crew duties aboard ship.		IA
USS RECLAIMER	Routine crew duties aboard ship.		IA
USS TAWASA	Routine crew duties aboard ship.		IA
	Recovered Project 1.2 pressure gauges on shot day and D+1.	0.24	IIC4
TU 7.3.5 (Land-Based Air Support)			
TE 7.3.5.1 (Air Patrol)	Flew patrol missions in P2V-5 aircraft out of CONUS. Aircraft did not penetrate cloud.		IA
TE 7.3.5.2 (Air Photographic)			
137th Mapping and Charting Squadron (USAF)	Flew photo recon missions in RB-50. Aircraft did not penetrate cloud.		IA
4901st AB Wing (USAF)	Flew photo recon missions in C-54. Aircraft did not penetrate cloud.		IA
TE 7.3.5.3 (Sample Distribution)	Transported samples to various laboratories.		IA
TE 7.3.5.4 (Hydrographic Survey)			
FASRON-10	Flew hydrographic survey missions in PB4&-2. Aircraft did not penetrate cloud.		IA

Table 26. Operation REDWING, Task Group 7.2 (Army) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for code.) L	C	Z	Y	E	S	F	B	K	O	I	D	M	A	N	T	H
7126th AU																			
Hq & Hq Det	Command and administrative functions on Enewetak Island.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
Service Det	Support functions on Enewetak Island. Rad-safe/decon activities not considered.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
Transport Det	Support functions on Enewetak Island. Rad-safe/decon activities not considered.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
MP Det	Support functions on Enewetak Island. Rad-safe/decon activities not considered.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
505th MP Bn	Security duty on Enewetak, Parry or Japtan Island. Activities on other islands not considered.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
8600th AU	Operated station on Enewetak Island. Departed PPG on 15 July.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA		
	Operated station on Eneu Island, moved to Bikini on 10 July; departed PPG on 15 July.		IA	IA	IICe	IA	IA	IA	V3	IA	IA	IA	IA	V4	IA	IA	IICc		

*Elements of code matrix are adjusted to shot-specific values.

Table 27. Operation REDWING, Task Group 7.3 (Navy) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for code.)															
			L	C	Z	Y	E	S	F	B	K	O	I	D	M	A	N	T	H
TU 7.3.0 (Flagship)																			
USS ESTES	Routine crew duties aboard ship.		IA	IA	V3	IA	I.\	IA	V3	IA	IA	IA	IA	IA	IA	IA	V2	V2	IA
TU 7.3.1 (Carrier)																			
USS BADOENG STRAIT	Routine crew duties aboard ship. Marine helo activities (HMR-363) not considered.		IA	IA	V3	IA	IA	IA	V3	IA	IA	IA	IA	V4	IA	IA	V2	V2	IA
TU 7.3.2 (Utility)																			
USS ABNAKI	Routine crew duties aboard ship. Decon of YNFBs not considered.		IA	IA	V3	IA	IA	IA	V3	IA	IA	IA	IA	V4	IA	IA	V2	V2	IA
USS CHICKASAW	Routine crew duties aboard ship. Decon of YNFBs not considered.		IA	IA	V3	IA	IA	IA	V3	IA	IA	IA	IA	V4	IA	IA	V2	V2	IA
USS LIPAN	Routine crew duties aboard ship. Decon of YNFBs not considered.		IA	IA	V3	IA	IA	IA	V3	IA	IA	IA	IA	V4	IA	IA	V2	IA	
USS SIOUX	Routine crew duties aboard ship. Project 2.63 activities not considered.		IA	IA	V3	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	V2	V2	IA
TU 7.3.3 (Surface Patrol & Transport)																			
USS KNUDSON	Routine crew duties aboard ship.		IA	IA	V3	IA	IA	IA	V3	IA	IA	IA	IA	IA	IA	IA	V2	IIDc*	IA
USS KYES	Routine crew duties aboard ship.		IA	IA	V2	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	V2	IA	V2	IA

*Washdown system employed during fallout; crew below deck. Otherwise, code V applies.

Table 27. Operation REDWING, Task Group 7.3 (Navy) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for code.)															
			L	C	Z	Y	E	S	F	B	K	O	I	D	M	A	N	T	H
USS SHELTON	Routine crew duties aboard ship.		IA	IA	V2	IA	IA	IA	IA	IA	IA	IA	IA	V4	IA	IA	V2	V3	IA
USS WALTON	Routine crew duties aboard ship.							IA	IA	IA	IA	IA	IA						
USNS BERNALILLO COUNTY	Routine crew duties aboard ship.		IIDc*	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	V1	V2	IA	V2	IA
TU 7.3.5 (Naval Station, Kwajalein)	General support on Kwajalein. VP-1 activities not included.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA
TU 7.3.7 (Boat Patrol)																			
USS CATAMOUNT	Routine crew duties aboard ship. Boat pool activities not considered.		IA	IA	V3	IA	IA	IA	V3	IA	IA	IA	IA	V4	IA	IA	V2	V2	IA
TU 7.3.8 (Special Devices)																			
USS CURTISS	Routine crew duties aboard ship.		IA	IA	V3	IA	IA	IA	V3	IA	IA	IA	IA	V4	IA	IA	V2	IIDc*	IA
TU 7.3.9 (Accommodations)																			
USS AINSWORTH	Routine crew duties aboard ship.		IA	IA	V3	IA	IA	IA	V3	IA	IA	IA	IA	V4	IA	IA	V2	IIDc*	IA

*Washdown system employed during fallout; crew below deck. Otherwise, code V applies.

Table 28. Operation REDWING, Task Group 7.4 (Air Force) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for code.) L	C	Z	Y	E	S	F	B	K	O	I	D	M	A	N	T	H
Hq, Task Group 7.4	Command and staff functions at Enewetak.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
Test Base Unit (TBU)																			
Hq, TBU	Command and staff functions at Enewetak.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
4931st Oper Sq	Ground support at the airbase on Enewetak Island. Flight operations and aircraft decon not considered.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
	Ground support at the airbase on Eneu Island. Flight operations and aircraft decon not considered.		IA	IA	IICe	IA	IA	IA	V3	IA	IA	IA	IA	V4	IA	IA	IICd	IICd	IA
4932nd Materiel Sq	Ground support at the airbase on Enewetak Island. Aircraft decon not considered.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
	Ground support at the airbase on Eneu Island. Aircraft decon not considered.		IA	IA	IICe	IA	IA	IA	V3	IA	IA	IA	IA	V4	IA	IA	IICd	IICd	IA
Test Svc Unit (TSU)																			
Hq, TSU	Command and staff functions at Enewetak.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA

*Elements of code matrix are adjusted to shot-specific values.

Table 28. Operation REDWING, Task Group 7.4 (Air Force) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for code.)															
			L	C	Z	Y	E	S	F	B	K	O	I	D	M	A	N	T	H
Weather Central	Manned Weather Central on Parry Island.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
Weather Recon Element	Based at Enewetak.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
	Flew cloud tracking missions in WB-50 aircraft. Cloud penetrations were avoided; crew breathed 100% oxygen if contact was made.		IB	IB	IB	IB	IB	IB	IB	IB	IB	IB	IB	IB	IB	IB	IB	IB	IB
Search and Rescue Element	Based at Enewetak.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
	Operated SA-16 aircraft; missions to contaminated areas not considered.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA
MATS Terminal	Operated air terminal on Enewetak Island.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
Communications Element	Operated air communication systems at Enewetak		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
	Operated air communication systems at Bikini (Eneu)		IA	IA	IICe	IA	IA	IA	V3	IA	IA	IA	IA	V4	IA	IA	IICd	IICd	IA
C-54 Support Element	Based at Enewetak		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IICd	IICd	IA	IICd*	IA
	Flew radio-telephone and general airlift missions in C-54 aircraft. Aircraft did not penetrate nuclear cloud.		IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA	IA

*Elements of code matrix are adjusted to shot-specific values.

Table 29. Operation HARDTACK I, Task Group 7.3 (Navy) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for codes.) Fr	Re	Hi	Ce	Po	Pi	Ju	Ol	Others
Navy Ships											
USNS AINSWORTH	TG 7.5 command and routine crew duties aboard ship.		V4	IA	IA	V2	V5	IA	IA	V1	IA
USS ARIKARI	Routine duties aboard ship.		V4*	IA	IA	V2		IA	IA	IA	IA
USS BELLE GROVE	Routine duties aboard ship.										IA
USS BENNER	Routine duties aboard ship.		V4	IA	IA	V2	V5	IA	V1	IA	IA
USS BOLSTER	Routine duties aboard ship.		V4*								IA
USS BONITA	Routine duties aboard ship.		V4*								IA
USS BOXER	Routine duties aboard ship. Marine helicopter operations (HMR-361) not considered.		V4*	V2	IA						IA
USS CACAPON	Routine duties aboard ship.			V2			V2	V1			IA
USS CHANTICLEER	Routine duties aboard ship.		V4*								IA
USS COGSWELL	Routine duties aboard ship.										IA
USS COLLETT	Routine duties aboard ship.		V4*	IA	IA	IA	IA	V1	IA	V1	IA
USS COMSTOCK	Routine duties aboard ship.										
USS CRAIG	Routine duties aboard ship.		IIDc**								IA

* Elements of code matrix are adjusted to shot-specific values.
** Washdown system employed during fallout; crew below deck. Otherwise code V applies.

Table 29. Operation HARDTACK I, Task Group 7.3 (Navy) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for codes.)								
			Fr	Re	Hi	Ce	Po	Pi	Ju	Ol	Others
USS CREE	Routine duties aboard ship.		V4*	V2	IA	IA	V2	V1	IA	V1	IA
USS DeHAVEN	Routine duties aboard ship.		V4	IA	IA	V2	IA	IA	IA	IA	IA
USS ELKHORN	Routine duties aboard ship.			IA							IA
USS EPPERSON	Routine duties aboard ship.										IA
USS GRASP	Routine duties aboard ship.		V4*								IA
USS HITCHITI	Routine duties aboard ship.										IA
USS HOOPER ISLAND	Routine duties aboard ship.		V4								IA
USS JOYCE	Routine duties aboard ship.										IA
USS KARIN	Routine duties aboard ship.										IA
USS LANSING	Routine duties aboard ship.										IA
USS LAWRENCE COUNTY	Routine duties aboard ship.										IA
USS MAGOFFIN	Routine duties aboard ship.			V2							IA
USS MANSFIELD	Routine duties aboard ship.		V4	V2	IA	IA	V2	V1	IA	V1	IA
USS MERAPI	Routine duties aboard ship.				IA	IA					IA
USS MOCTOBI	Routine duties aboard ship.		V4								IA
USS MONTICELLO	Routine duties aboard ship.		V4	IA	IA	IA	IA	V1	V1	V1	IA

* Elements of code matrix are adjusted to shot-specific values.

Table 29. Operation HARDTACK I, Task Group 7.3 (Navy) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for codes.)								
			Fr	Re	Hi	Ce	Po	Pi	Ju	Ol	Others
USS MUNSEE	Routine duties aboard ship.		V4*								IA
USS NAVARRO	Routine duties aboard ship.					IA	V2	V1	IA	V1	IA
USS NEMASKET	Routine duties aboard ship.							IA			IA
USS ORLECK	Routine duties aboard ship.		V4*								IA
USS PARKS	Routine duties aboard ship.		V4*								IA
USS PERKINS	Routine duties aboard ship.		V4								IA
USS REHOBOTH	Routine duties aboard ship.		V4								IA
USS RENVILLE	Routine duties aboard ship.		IIDc**								IA
USS SAFEGUARD	Routine duties aboard ship.										IA
USS SILVERSTEIN	Routine duties aboard ship.										
USS STERLET	Routine duties aboard ship.		V4*								IA
USS TAKELMA	Routine duties aboard ship.		V4								IA
USS TILLAMOOK	Routine duties aboard ship.										IA
USS TOMBIGBEE	Routine duties aboard ship.										IA
USS LST-664	Routine duties aboard ship.		V4								IA

* Elements of code matrix are adjusted to shot-specific values.
** Washdown system employed during fallout; crew below deck. Otherwise code V applies.

Table 30. Operation HARDTACK I, Task Group 7.4 (Air Force) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (See Appendix for shot abbreviations and text for code.) Fr	Ju	Te	Or	Others
4928th Test Sq (Atomic)	Flew RB-36 aircraft out of Kirtland AFB in support of Projects 8.2, 8.3, and 8.4. Aircraft did not penetrate cloud.			IA	IA	IA	
224th Ops Group, Ionosphere Element (TAU)	Flew C-97 aircraft out of Hickam Field, HI, in support of TG 7.1 projects. Aircraft did not penetrate cloud.				IA	IA	
IBDA Element (TAU)	Flew IBDA missions in B-47 aircraft out of Anderson AFB. Guam. Aircraft did not penetrate cloud.						IA
6th Weather Sq Weather Reporting Element (TSU)	Operated weather station at Utirik, Ujelang, Wotho or Rongelap until 24 Aug.		IICe	IA	IA	IA	IA
	Operated weather station at Tarawa, Kapingamarangi, Nauru or Kusaie.		IA	IA	IA	IA	IA
1253rd AACS Sq Communications Element (TSU)	Operated communications station at Utirik, Ujelang, Wotho or Rongelap until 24 Aug.		IICe	IA	IA	IA	IA
	Operated communication station at Tarawa, Kapingamarangi, Nauru or Kusaie.		IA	IA	IA	IA	IA

Table 31. Operation ARGUS, scientific project participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ARGUS-1	ARGUS-2	ARGUS-3
Experimental Projects					
7.1 Satellite Measurements	Launched Explorer IV and Explorer V satellites from Cape Canaveral, FL, to measure the artificial radiation belt created by the ARGUS shots.		IA	IA	IA
7.2 Sounding Rocket Measurements	Launched rockets to measure the high energy electron flux resulting from the first two ARGUS shots. Launch points were Wallops Island, VA; Patrick AFB, FL; and Ramey AFB, P.R.		IA	IA	
7.3 Surface Measurements	Made measurements to study the effects of electrons emitted by the high altitude burst that extended to the Earth's lower atmosphere. Measurements were obtained from ground-based, shipboard, and airborne (C-97 aircraft) platforms.		IA	IA	IA
7.4 Nuclear Weapon Launch Support	Provided the personnel, equipment, and support to place three nuclear weapons at an exospheric altitude and provided tracking information to ascertain the actual height of burst.		IA	IA	IA
7.5 Satellite Launching from Aircraft	Attempted to launch a satellite from a Navy F4D-1 aircraft over the Pacific Missile Range.		IA	IA	IA

Table 32. Operation ARGUS, Task Force 88 (predominantly Navy) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ARGUS 1	ARGUS-2	ARGUS-3
CTF 88 Staff	Command and staff functions aboard TARAWA.		IA	IA	IA
TG 88.1 (Carrier)					
USS TARAWA	Routine crew duties aboard ship.		IA	IA	IA
Marine Det	Security duties aboard ship		IA	IA	IA
VS-32	Flew anti-submarine, scientific measurement, and photographic missions.		IA	IA	IA
HS-5	Flew intra-task force transportation missions in HSS-1 helicopters.		IA	IA	IA
MSQ-1A crew (USAF)	Operated USAF radar equipment aboard ship.		IA	IA	IA
TG 88.2 (Destroyer)					
USS WARRINGTON	Routine crew duties aboard ship.		IA	IA	IA
USS BEARSS	Routine crew duties aboard ship.		IA	IA	IA
USS HAMMERBERG	Routine crew duties aboard ship.		IA	IA	IA
USS COURTNEY	Routine crew duties aboard ship.		IA	IA	IA
TG 88.3 (Mobile Logistics)					
USS NEOSHO	Routine crew duties aboard ship.		IA	IA	IA
MSQ-1A crew (USAF)	Operated USAF radar aboard ship.		IA	IA	IA
USS SALAMONIE	Routine crew duties aboard ship.		IA	IA	IA

Table 32. Operation ARGUS, Task Force 88 (predominantly Navy) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ARGUS-1	ARGUS-2	ARGUS-3
TG 88.4 (Missile)					
USS NORTON SOUND	Routine crew duties aboard ship.		IA	IA	IA
TG 88.5 (Scientific Support)					
USS ALBEMARLE	Routine crew duties aboard ship.		IA	IA	IA
TG 88.6 (Headquarters)					
AFSWP	This group was located at the Pentagon and provided liaison among CTF88, Chief AFSWP, ARPA, and the scientific agencies responsible for conducting the experimental projects.		IA	IA	IA

Table 33. Operation DOMINIC 1, Joint Task Group 8.3 (Navy) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ALL*
Navy Ships			
USS ABNAKI	Routine crew duties aboard ship.		IA
USNS ALATNA	Routine crew duties aboard ship.		IA
USS ARIKARA	Routine crew duties aboard ship.		IA
USS CABILDO	Routine crew duties aboard ship.		IA
USS CHEMUNG	Routine crew duties aboard ship.		IA
USS CHICKASAW	Routine crew duties aboard ship.		IA
USS CHIPOLA	Routine crew duties aboard ship.		IA
USS CONSERVER	Routine crew duties aboard ship.		IA
USS ENGAGE	Routine crew duties aboard ship.		IA
USS FALGOUT	Routine crew duties aboard ship.		IA
USS FINCH	Routine crew duties aboard ship.		IA
USS FORSTER	Routine crew duties aboard ship.		IA
USS FORT MARION	Routine crew duties aboard ship.		IA
USS GRAPPLE	Routine crew duties aboard ship.		IA
USS GURKE	Routine crew duties aboard ship.		IA
USNS HARRIS COUNTY	Routine crew duties aboard ship.		IA
USS HITCHITI	Routine crew duties aboard ship.		IA
USS HOPEWELL	Routine crew duties aboard ship.		IA
USS IMPERVIOUS	Routine crew duties aboard ship.		IA
USS INFLICT	Routine crew duties aboard ship.		IA
USS IWO JIMA	Routine crew duties aboard ship.		IA
USS JENKINS	Routine crew duties aboard ship.		IA
USS JEROME COUNTY	Routine crew duties aboard ship.		IA
USS LANSING	Routine crew duties aboard ship.		IA
USS LOYALTY	Routine crew duties aboard ship.		IA

* All shots involving unit participation.

Table 33. Operation DOMINIC I, Joint Task Group 8.3 (Navy) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ALL*
USS MARSHALL	Routine crew duties aboard ship.		IA
USS MATACO	Routine crew duties aboard ship.		IA
USS JOHN S. MCCAIN	Routine crew duties aboard ship.		IA
USS MONTICELLO	Routine crew duties aboard ship.		IA
USS MUNSEE	Routine crew duties aboard ship.		IA
USS NEWELL	Routine crew duties aboard ship.		IA
USS OAK HILL	Routine crew duties aboard ship.		IA
USS O'BANNON	Routine crew duties aboard ship.		IA
USS PAGE COUNTY	Routine crew duties aboard ship.		IA
USNS PVT FRANK S. PETRARCA	Routine crew duties aboard ship.		IA
USNS POINT BARROW	Routine crew duties aboard ship.		IA
USS POLK COUNTY	Routine crew duties aboard ship.		IA
USS HALSEY POWELL	Routine crew duties aboard ship.		IA
USS PONCHATOULA	Routine crew duties aboard ship.		IA
USS PRINCETON	Routine crew duties aboard ship.		IA
USNS RANGE TRACKER	Routine crew duties aboard ship.		IA
USS RECLAIMER	Routine crew duties aboard ship.		IA
USS ROWAN	Routine crew duties aboard ship.		IA
USS SAFEGUARD	Routine crew duties aboard ship.		IA
USS SNOHOMISH COUNTY	Routine crew duties aboard ship.		IA
USS SOUTHERLAND	Routine crew duties aboard ship.		IA
USS SUMMIT COUNTY	Routine crew duties aboard ship.		IA
USS TAKELMA	Routine crew duties aboard ship.		IA
USS TAYLOR	Routine crew duties aboard ship.		IA
USS TOLOVANA	Routine crew duties aboard ship.		IA
USS WALKER	Routine crew duties aboard ship.		IA

* All shots involving unit participation.

Table 34. Operation DOMINIC I, Task Group 8.4 (Air Force) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ALL*
TU 8.4.1			
Headquarters Element	Command and general support function on Christmas Island.		IA
TU 8.4.2			
Drop and Diagnostics Element (Sewart AFB)	Flew C-130 aircraft out of NAS Barbers Point or Christmas Island in support of diagnostic measurements.		IA
Air Control Element (552nd AEW & C Wg)	Flew RC-121 aircraft out of Christmas Island, Hickam AFB or the Fiji Islands on airborne control, radar tracking or communications missions.		IA
ASD Effects Element	Flew B-57 aircraft out of Christmas Island in support of thermal radiation studies.		IA
Helicopter Element (3635th Photo Mapping Wg)	Flew search and rescue and local transportation missions out of Christmas Island. Nosecone recovery operations not considered.		IA
Documentary Photo Element (1370th Photo Mapping Wg)	Took documentary photos from C-54 aircraft operating out of Christmas Island.		IA
Weather Reporting Element (6th Weather Squadron)	Operated weather stations at Hickam AFB, the Samoas, Johnston Island, Christmas Island and Malden. Palmyra site excluded.		IA
Reconnaissance Element (1211th Test Squadron)	Flew cloud sampling missions in B-57 aircraft. Crew breathed 100% oxygen. Aircraft decon not considered.		IB

* All shots involving unit participation.

Table 34. Operation DOMINIC I, Task Group 8.4 (Air Force) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ALL*
(55th Weather Recon Sq)	Flew weather reconnaissance missions in WB-50 aircraft out of Christmas Island and Hickam.		IA
TU 8.4.3			
High Altitude Element	Flew high altitude weather photography missions in U-2 aircraft out of Hickam AFB (FISHBOWL).		IA/B
	Flew KC-135 or B-47 aircraft out of Hickam AFB for communications experiments (FISHBOWL).		IA
Medical Test Element	Flew C-118 and C-54 aircraft out of Hickam AFB for medical effects (retinal burn) studies.		IA
Calibration Element (Air National Guard)	Flew KC-97 aircraft out of Hickam AFB to calibrate missile tracking radar equipment.		IA
TU 8.4.4			
Drop and Diagnostics Element	Flew B-52 drop aircraft out of NAS Barbers Point.		IA
	Maintained C-130 diagnostics aircraft (flown by TU 8.4.2) at NAS Barbers Point.		IA

* All shots involving unit participation.

Table 35. Operation DOMINIC I, Task Group 8.6 (Johnston Island Base Command) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ALL
TU 8.6.1			
6488th Air Base Sq (USAF)	Operated the base and provided general support on Johnston Island.		IA
TU 8.6.2			
1957th Comm Gp (USAF)	Communications support on Johnston Island.		IA
TU 8.6.3			
1502nd Air Transport Wing, Det 6 (USAF)	Operated the air terminal and provided cargo handling support on Johnston Island.		
TU 8.6.4			
524th MP Co, 1st Platoon (Army)	Provided security, criminal investigation, traffic control, etc. on Johnston Island.		IA
TU 8.6.5			
81st Transportation Co, Helicopter Det (Army)	Performed search and rescue and area surveillance missions around Johnston Island.		IA
Other Units			
USAS DAVIDSON (Army)	Conducted dredging operations prior to operation.		
Underwater Demolition Team 11 (Navy)	Cleared Johnston Island channel bottom prior to operation.		
Amphib Const Bn 1 (Navy)	General support on Johnston Island.		IA

Table 36. Operation DOMINIC I, Task Group 8.7 (Christmas Island Base Command) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) ALL
All (unspecified)	Medical and general support on Christmas Island.		IA

Table 37. Operation DOMINIC I, Task Group 8.8 (Frigate Bird) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) FRIGATE BIRD
Flagship and Range Safety Unit			
USS NORTON SOUND	JTF8 command or routine crew duties aboard ship.		IA
Launch Area Surveillance Unit			
USS YORKTOWN (CVSG-55 included)	Routine crew duties (including aircraft operations).		IA
Destroyer Unit			
USS MADDOX	Routine crew duties aboard ship.		IA
USS BRUSH	Routine crew duties aboard ship.		IA
USS SAMUEL N. MOORE	Routine crew duties aboard ship.		IA
USS PRESTON	Routine crew duties aboard ship.		IA
Fleet Ballistic Submarine Unit			
USS ETHAN ALLEN	Routine crew duties aboard submarine.		IA
Replenishment Unit			
USS PONCHATOULA	Routine crew duties aboard ship.		IA
Land-Based Naval Air Unit			
Patrol Squadron 28	Flew search and rescue missions in P2V-5FS aircraft out of Christmas Island.		IA
Patrol Squadron 872	Flew search and rescue missions in P2V-5FS aircraft out of Christmas Island.		IA

Table 37. Operation DOMINIC I, Task Group 8.8 (Frigate Bird) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) FRIGATE BIRD
Surface Surveillance Unit			
USS SOUTHERLAND	Routine crew duties aboard ship.		IA
USS FALGOUT	Routine crew duties aboard ship.		IA
Burst Observation Unit			
USS MEDREGAL	Routine crew duties aboard submarine.		IA
USS CARBONERO	Routine crew duties aboard submarine.		IA

Table 38. Operation DOMINIC I, Task Group 8.9 (Swordfish) participants with bone dose commitment less than 150 millirem.

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) SWORDFISH
TU 8.9.1 Operation SWORDFISH Test directorate			
TE 8.9.1.1 VELA Project Elements			
USS TAWAKONI	Routine crew duties aboard ship.		IA
USS ARIKARA	Routine crew duties aboard ship.		IA
USS LIPAN	Routine crew duties aboard ship.		IA
USS CREE	Routine crew duties aboard ship.		IA
USS GANNET	Routine crew duties aboard ship.		IA
TE 8.9.1.2 Weather Reconnaissance Element			
Patrol Sq 46	Flew radiological survey missions over radioactive pool in P2V-7 aircraft out of NAS North Island.		IA
TE 8.9.1.3 Technical Photography Element			
Hvy Photo Sq 62	Photographic support.		IA
Marine Aircraft Repair Sq 37	Photographic support.		IA
Mobile Photo Unit, Pacific	Photographic support.		IA

Table 38. Operation DOMINIC I, Task Group 8.9 (Swordfish) participants with bone dose commitment less than 150 millirem (Continued).

PROJECT/UNIT	ACTIVITY	D_{FB}	SHOTS/CODE (see text) SWORDFISH
TU 8.9.3 Operational Unit			
TE 8.9.3.1 Weapon and Sonar System Test Element			
USS AGERHOLM	Routine crew duties aboard ship.		IA
USS RICHARD ANDERSON	Routine crew duties aboard ship.		IA
USS HOPEWELL	Routine crew duties aboard ship.		IA
USS RAZORBACK	Routine crew duties aboard ship.		IA
USS SEA FOX	Routine crew duties aboard ship.		IA
TE 8.9.3.2 Towed Array Streaming Element			
USS MONTICELLO (including HMR-363)	Routine crew duties aboard ship. Decon station and radioactive material storage operations not included.		IA
USS BAUSELL	Routine crew duties aboard ship.		IA
TE 8.9.3.3 Surveillance Element			
USS YORKTOWN (including air units)	Routine crew duties aboard ship.		IA
USS MADDOX	Routine crew duties aboard ship.		IA
USS BRUSH	Routine crew duties aboard ship.		IA
USS SAMUEL N. MOORE	Routine crew duties aboard ship.		IA
USS PRESTON	Routine crew duties aboard ship.		IA

SECTION 3

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APPENDIX

LIST OF ABBREVIATIONS

1. OPERATIONS

X - CROSSROADS
S - SANDSTONE
G - GREENHOUSE
I - IVY
C - CASTLE
R - REDWING
H - HARDTACK
D - DOMINIC

II. SHOTS

Operation CASTLE

B - BRAVO
R - ROMEO
K - KOON
U - UNION
Y - YANKEE
N - NECTAR

Operation REDWING

Z - ZUNI
Y - YUMA
E - ERIE
S - SEMINOLE
F - FLATHEAD
K - KICKAPOO
O - OSAGE
I - INCA
D - DAKOTA
M - MOHAWK
A - APACHE
N - NAVAJO
T - TEWA
H - HURON

Operation HARDTACK I

Ca - CACTUS
Fr - FIR
Bu - BUTTERNUT
Ko - KOA
Wh - WAHOO
Ho - HOLLY
Nu - NUTMEG
Ye - YELLOWWOOD
Mg - MAGNOLIA
To - TOBACCO
Sy - SYCAMORE
Um - UMBRELLA
Mp - MAPLE
As - ASPEN
Wn - WALNUT
Li - LINDEN
Re - REDWOOD
El - ELDER
Oa - OAK
Hi - HICKORY
Sq - SEQUOIA
Ce - CEDAR
Do - DOGWOOD
Po - POPLAR
Sc - SCAEVOLA
Pi - PISONIA
Ju - JUNIPER
Ol - OLIVE
Pn - PINE
Te - TEAK
Qu - QUINCE
Or - ORANGE
Fg - FIG

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